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Diehl, Dana L.
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# Upper Susquehanna Subbasin Survey

## Small Watershed Study

Monitoring Report No. 1A
Oct. 1, 1999 through Aug. 31, 2000

Susquehanna River Basin Commission

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## Introduction

The Susquehanna River Basin Commission (SRBC) conducts a water quality and biological assessment of each of the six major subbasins (Figure 1) approximately every 10 years on a rotating schedule. The SRBC assessment has provided information used to:

- Evaluate the chemical, biological, and habitat conditions of streams in the basin;
- Identify major sources of pollution and lengths of stream impacted;
- Maintain a database that can be used to document changes in stream quality over time;
- Review projects affecting water quality in the basin; and
- Identify areas for more intensive study.

Initally, SRBC's subbasin surveys were based on a single, "broad, brush stroke" sampling effort, providing results from one year of sampling in each subbasin. All sampling was performed during the summer under relatively stable flow conditions. Starting with this most current assessment of the Upper Susquehanna Subbasin, SRBC changed the format to include a second, intensive year of sampling that focuses on specific areas of impairment in each subbasin and/or provides current data to local watershed groups for remediation or conservation efforts.

The following report contains information concerning data collected for the Small Watershed Study during the second year of the Upper Susquehanna Subbasin Survey. SRBC publication No. 203, entitled Upper Susquehanna Subbasin: A Water Quality and Biological Assessment (Stoe, 1999), contains information from the first year of sampling for the entire Upper Susquehanna Subbasin.

**Report By:**

Dana L. Diehl
*Biologist*

Darryl L. Sitlinger
*Water Quality Technician*

Water Quality and Monitoring Programs

*Figure 1. Susquehanna River Subbasins*



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# Methods Used in the Subbasin Survey

## Field and Laboratory Methods

### *Site placement and sampling frequency*

Field and laboratory data (see Appendix) for year-two Upper Susquehanna Subbasin sampling were collected during periods of high precipitation, as well as periods of little or no precipitation when stream flows were maintained primarily by baseflow. Twenty sites were sampled bimonthly, starting in October 1999, and ending in August 2000 (Figure 2).

These sampling sites (Table 1) were selected after consultation with the New York State Department of Environmental Conservation (NYSDEC), the Upper Susquehanna Coalition, and the State University of New York at Binghamton (SUNY-Binghamton). The sites were chosen to help clarify the effects of major tributaries and major urban areas on streams, as well as facilitate watershed management planning and remediation activities.

Macroinvertebrate samples were collected from seventeen of the twenty sites using a slightly modified version of the U.S. Environmental Protection Agency's Rapid Bioassessment Protocols (RBP). RBP III, the most detailed of the three protocols, was used in this study, and is capable of showing levels of stream impairment. Using the RBP III method allows for comparison of habitat and biological scores of sample sites to a reference site. The reference site represents an area of minimal disturbance within an ecological region. The remaining three sites on the main stem of the Susquehanna and Chenango Rivers were sampled for water quality purposes only and were not included in the RBP III study. Water quality samples were collected at each river site using a depth integrated sampler.

## Field Analysis

Physical and chemical parameters measured for field and laboratory analysis are listed in Table 2. The following equipment was used for field analysis: a Cole-Parmer Model 1481 meter was used to determine conductivity; a Cole-Parmer Model 5996 meter was used to determine pH; and a YSI Model 55 dissolved oxygen meter was used to determine dissolved oxygen. Alkalinity was determined by titration of a known volume of sample water to pH 4.5, with 0.02 N $H_2SO_4$. Acidity was determined by titration of a known volume of sample water to pH 8.3, with 0.02 N NaOH.

**Table 2. Water Quality Parameters Sampled in the Upper Susquehanna Subbasin Small Watershed Study**

| **Field Parameters** |
|---|
| Temperature, °C |
| Flow, instantaneous cfs |
| pH |
| Conductivity, umhos/cm |
| Dissolved Oxygen, mg/l |
| Acidity, mg/l |
| Alkalinity, mg/l |
| **Laboratory Analysis** |
| Total Residue, mg/l |
| Total Suspended Solids, mg/l |
| Nitrogen, Total, mg/l |
| Ammonia, Total, mg/l |
| Nitrite-N, Total, mg/l |
| Nitrate-N, Total, mg/l |
| Phosphorous, Total, mg/l |
| Organic Carbon, Total, mg/l |
| Orthophosphate, Total, mg/l |

## Laboratory Analysis

Water samples for laboratory analysis were collected at each site to measure nutrient concentrations. Two 250-ml bottles of water were collected for laboratory analyses. One bottle was acidified to pH 2, or less, with sulfuric acid for nutrient analysis. Samples were iced and shipped to the Pennsylvania Department of Environmental Protection, Bureau of Laboratories in Harrisburg, Pa.

Water quality was assessed with a simple Water Quality Index (WQI), using procedures established by McMorran and Bollinger (1990). Comparisons were made among sampling periods at each station using this WQI. Eleven parameters were considered, eight of which were nutrients. Each parameter from every site was ranked from 0 to 100 to obtain a percentile score. Based on analysis of parameters, each site then was designated "excellent," "good," "fair," or "poor."

### *Macroinvertebrate and physical habitat sampling*

Benthic macroinvertebrates were collected from each sample site, except those on the main stem of the Susquehanna and the Chenango Rivers. These river sites were nonwadeable, with no riffles available for sampling. The benthic macroinvertebrate community of each stream site was sampled to provide an indication of the biological condition of the stream.

Benthic macroinvertebrate samples were analyzed using procedures described in Rapid Bioassessment Protocol for Use in Streams and Rivers by Plafkin and others (1989).

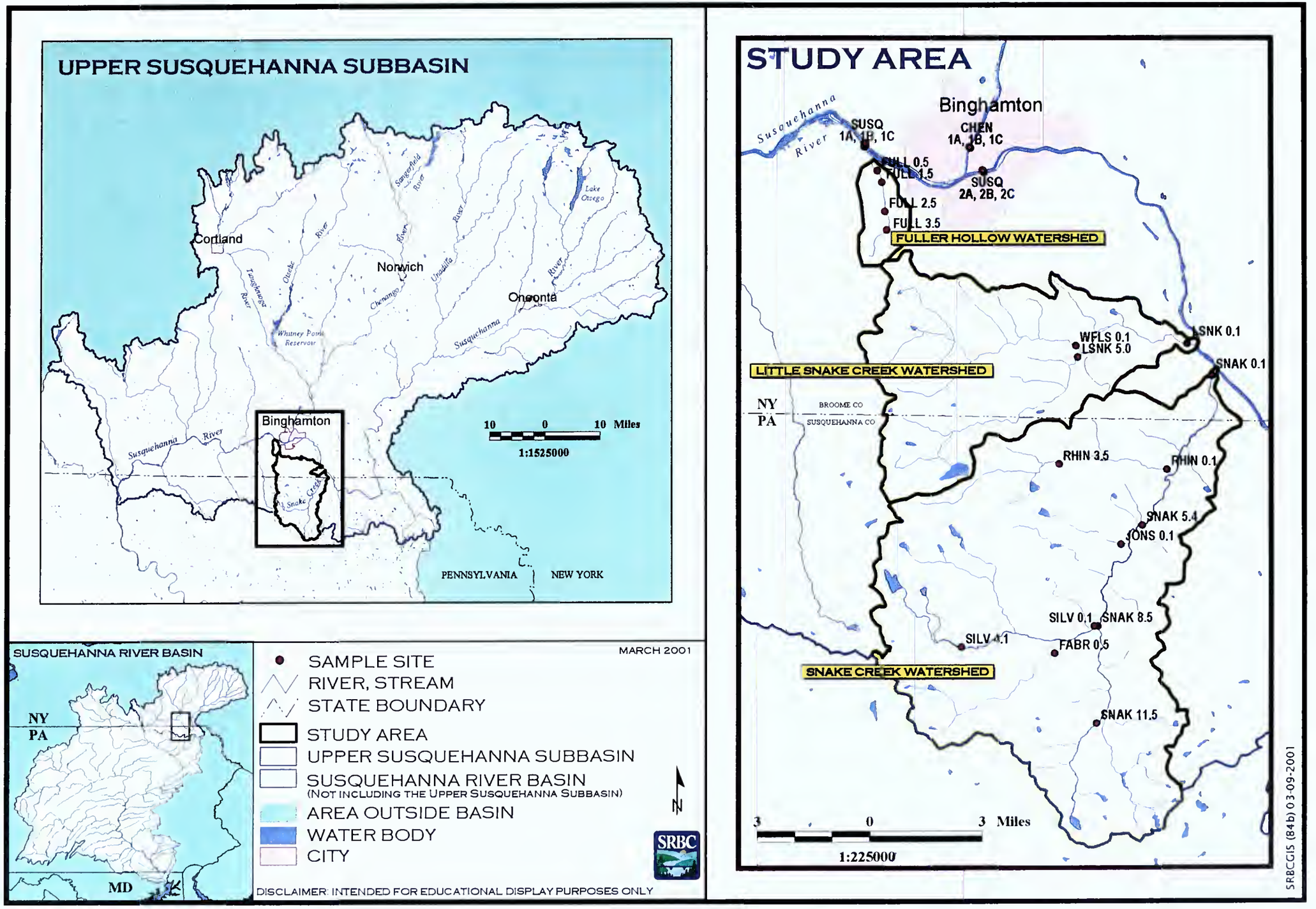


*Figure 2. Upper Susquehanna Subbasin Survey Small Watershed Study Site Locations*

**Table 1. Upper Susquehanna Subbasin Survey Small Watershed Study Site Locations**

| Sample Site No. | Site Name | Site Location Description | Latitude | Longitude |
|---|---|---|---|---|
| 1 | FABR 0.5 | Fall Brook at Salt Spring State Park near Franklin Forks, Pa. | 415426 | 755206 |
| 2 | SNAK 11.5 | Snake Creek 3 miles north of Lake Montrose near Montrose, Pa. | 415249 | 755047 |
| 3 | SNAK 8.5 | Snake Creek at Forks Hill Road bridge, Franklin Forks, Pa. | 415504 | 755046 |
| 4 | SNAK 5.4 | Snake Creek at Shadow Brook Road bridge, near Stanfordville, Pa. | 415725 | 754925 |
| 5 | SNAK 0.1 | Snake Creek at N.Y. Route 7a bridge, Corbettsville, N.Y. | 420055 | 754719 |
| 6 | SILV 4.1 | Silver Creek at Pa Route 167 bridge near Fisk Mill, Pa. | 415433 | 755460 |
| 7 | SILV 0.1 | Silver Creek at Pa Route 29 bridge, Franklin Forks, Pa. | 415504 | 755053 |
| 8 | JONS 0.1 | Jones Creek at Route Pa 29 bridge near Stanfordville, Pa. | 415658 | 755005 |
| 9 | RHIN 3.5 | Rhiney Creek at dirt road bridge near Brookdale, Pa. | 415849 | 755202 |
| 10 | RHIN 0.1 | Rhiney Creek at Pa Route 29 bridge, Brookdale, Pa. | 415843 | 754841 |
| 11 | LSNK 5.0 | Little Snake Creek at Gregory Road bridge, Conklin Forks, N.Y. | 420119 | 755129 |
| 12 | LSNK 0.1 | Little Snake Creek at Erie-Lackawanna RR bridge, Conklin, N.Y. | 420139 | 754806 |
| 13 | WFLS 0.1 | West Fork Little Snake Creek upstream of confluence with Little Snake Creek, Conklin Forks, N.Y. | 420135 | 755133 |
| 14 | FULL 3.5 | Fuller Hollow Creek in the park at Fuller Hollow Road, Binghamton, N.Y. | 420414 | 755728 |
| 15 | FULL 2.5 | Fuller Hollow Creek at the foot bridge in the park area south of the SUNY- Binghamton campus, Binghamton, N.Y. | 420440 | 755732 |
| 16 | FULL 1.5 | Fuller Hollow Creek at the foot bridge to SUNY-Binghamton campus parking lot, Binghamton, N.Y. | 420521 | 755738 |
| 17 | FULL 0.5 | Fuller Hollow Creek near rugby fields on SUNY-Binghamton campus, Binghamton, N.Y. | 420537 | 755747 |
| 18a | SUSQ 1A | Susquehanna River at the N.Y. Route 201 bridge-left bank, Binghamton, N.Y. | 420610 | 755812 |
| 18b | SUSQ 1B | Susquehanna River at the N.Y. Route 201 bridge-center, Binghamton, N.Y. | 420612 | 755811 |
| 18c | SUSQ 1C | Susquehanna River at the N.Y. Route 201 bridge-right bank, Binghamton, N.Y. | 420615 | 755809 |
| 19a | SUSQ 2A | Susquehanna River at the Exchange Street bridge-left bank, Binghamton, N.Y. | 420536 | 755428 |
| 19b | SUSQ 2B | Susquehanna River at the Exchange Street bridge-center, Binghamton, N.Y. | 420538 | 755429 |
| 19c | SUSQ 2C | Susquehanna River at the Exchange Street bridge-right bank, Binghamton, N.Y. | 420539 | 755430 |
| 20a | CHEN 1A | Chenango River at the Memorial Bridge-left bank, Binghamton, N.Y. | 420610 | 755453 |
| 20b | CHEN 1B | Chenango River at the Memorial Bridge-center, Binghamton, N.Y. | 420610 | 755454 |
| 20c | CHEN 1C | Chenango River at the Memorial Bridge-right bank, Binghamton, N.Y. | 420611 | 755456 |

Sampling was performed using a 1-meter-square kick screen with size No. 30 mesh. The kick screen was stretched across the current to collect organisms dislodged from riffle/run areas by physical agitation of the stream substrate. Two kick screen samples were collected from a representative riffle/run at each station. The two samples were composited and preserved in isopropyl alcohol for later laboratory analysis.

In the laboratory, composite samples were sorted into 100-organism subsamples using a gridded pan and a random numbers table. The organisms contained in the subsamples were identified to genus (except Chironomidae) and enumerated. Six statistical measurements, or metrics (Table 3), then were used to analyze the macroinvertebrate data and determine the biological condition of each site. This was accomplished by expressing each of the metrics as a percentage of the reference score. These scores were summed to produce a total score for each site. Then, the total score was expressed as a percentage of the reference score to provide a biological condition category, designated as "nonimpaired," "slightly impaired," "moderately impaired," or "severely impaired."

**Table 3. Metrics Used to Analyze Macroinvertebrate Data in the Upper Susquehanna Subbasin Small Watershed Study**

**Taxonomic Richness** - The total number of taxa in the sample.

**Shannon Diversity Index** - A measure of the diversity of the community. A macro invertebrate community in a stream with good water quality and habitat will have a diverse number of taxa with no one taxa dominating over the others, while poor water quality and habitat produce stressful conditions that allow one or more taxa to dominate.

**Hilsenhoff Biotic Index** - A measure of organic pollution tolerance. The lower the number, the less tolerant the macroinvertebrate community is to pollution.

**EPT Index** - Mayflies (Ephemeroptera), stoneflies (Plecoptera), and caddisflies (Tricoptera) are collectively referred to as EPT. These aquatic insects are very sensitive to water pollution, and are often used as indicators of good water quality. Thus, the EPT Index is another measure of pollution tolerance. A high EPT Index indicates that the stream supports a healthy biological community due to a good water quality.

**Percent Taxonomic Similarity** - A measure of the similarity between the kinds of organisms in the sample and those found at the reference site.

**Percent Trophic Similarity** - Feeding habits of aquatic insects (shredding, filtering-collecting, scraping, predation, and collecting-gathering) reflect the food resources available to them. Available food resources, in turn, mirror the way energy, in the form of organic matter, is distributed throughout an aquatic ecosystem. A trophically-balanced community has a good spread of all feeding types. All sites are measured against a healthy reference site and assigned scores that reflect their trophic balance in relation to that reference site.

Habitat conditions were evaluated using a modified version of RBP III (Plafkin, 1989). Parameters relating to substrate and instream cover were rated on a scale from 0 to 20, with 20 being optimal. These included bottom substrate, embeddedness, and velocity/depth diversity. Parameters relating to channel morphology were rated on a scale from 0 to 15, and included pool/riffle or run/bend ratio, pool quality, riffle/run quality, and channel alteration. Bank erosion, bank stability, streamside cover, and riparian zone were rated on a scale from 0 to 10. Land uses, types of bottom substrate, and other important stream characteristics also were noted.

Habitat scores were summed to produce a total habitat score for each site. These scores then were compared to the total score of the reference site to determine the degree to which the site's habitat could support aquatic life. Sites were characterized as "excellent," "supporting," "partially supporting," or "nonsupporting."

# Results

The seventeen sample sites included in the RBP III sampling method fall within three subwatersheds: Snake Creek; Little Snake Creek; and Fuller Hollow Creek (Figure 1). The reference site for this study was on Fall Brook in the Snake Creek subwatershed.

## Snake Creek Subwatershed

Ten sites were sampled in this subwatershed, four of which were on the main stem of Snake Creek. The remaining six sites were on tributaries (Silver Creek, Fall Brook, Jones Creek, and Rhiney Creek) to Snake Creek. Water quality at all sites in this subwatershed was good to excellent for each sampling period.

Habitat scores for SNAK 5.4, SNAK 8.5, and SNAK 11.5 were excellent, while SNAK 0.5 was rated as supporting. The remaining tributary sites (RHIN 0.1, RHIN 4.5, JONS 0.1, and SILV 4.1) had a habitat rating of excellent, except for SILV 0.1, which had a rating of partially supporting. Channel alteration, lack of riparian zone, and poor pool quality were the main causes of lower habitat scores at SNAK 0.5 and SILV 0.1.

Biological scores indicated RHIN 0.1, RHIN 3.5, JONS 0.1, SILV 4.1, SNAK 8.5, and SNAK 11.5 were slightly impaired. It should be noted, however, that of those six sites, only JONS 0.1 showed signs of actual impairment due to a low Ephemeroptera/Plecoptera/Tricoptera (EPT) Index score.

The reference site, FABR 0.5, had an extremely low Hilsenhoff Biotic Index score (HBI) (0.789) due to large numbers of *Leuctra* (Plecoptera: Leuctridae) (Hilsenhoff of 0) and *Dolophilodes* (Trichoptera: Philopotamidae) (Hilsenhoff of 0) found at this site. Therefore, although the other five sites had macroinvertebrate communities with a low HBI, they were not as low as the HBI for the reference site community, and received a slightly impaired score. JONS 0.1, although it had a HBI comparable to the reference site, rated poorly in areas of taxonomic richness, percent taxonomic similarity, and percent trophic similarity. SILV 0.1 and SNAK 5.0 were nonimpaired, and SNAK 0.5 had moderate impairment due to a low EPT Index score.

## Little Snake Creek Subwatershed

Three sites were sampled in the Little Snake Creek subwatershed: two on the main stem of Little Snake Creek, and one on West Fork Little Snake Creek. Water quality at all three sites was assessed as good to excellent during all sampling periods, except for LSNK 0.1, which had a rating of "fair" during the April sampling event. Total orthophosphate was significantly elevated at this site during this time, possibly due to increased agricultural activity.

WSLC 0.1 and LSNK 5.0 had habitat ratings of supporting, while LSNK 0.1 had a rating of partially supporting due to lack of bank stability, and extensive channel alteration and bank erosion from heavy dredging activities within the channel. All three sites had poor riparian zones.

Biological scores for WLSC 0.1 and LSNK 0.1 showed moderate impairment; however, this biological score may not reflect the actual state of biological conditions for LSNK 0.1. Although total number of common taxa and taxonomic richness were low in both samples, it should be noted that the majority of the LSNK 0.1 sample was comprised of cast skins (the shed exoskeletons of macroinvertebrates).

Normally, a macroinvertebrate sample is comprised of a count of 100 organisms. In the case of LSNK 0.1 though, a large percentage of the sample was cast skins, not actual macroinvertebrates (it should be noted that the previously mentioned heavy dredging at this site may have affected the organism count). Because cast skins cannot, in most cases, be accurately identified to genus, they were not counted. Therefore, the total number of common taxa and taxonomic richness for this sample skewed lower than it might have been otherwise.

The taxonomic richness score for LSNK 0.1 and WLSC 0.1 was low, but again, the score for LSNK 0.1 was probably lower due to the presence of the cast skins. LSNK 5.0 showed a biological score of slightly impaired; however, the HBI for this site was low. As with the sites in Snake Creek, when the HBI of this site was compared to the extremely low HBI of the reference site, it scored as slightly impaired. All other

biological condition scores for LSNK 5.0 were high, except for tropic similarity.

## Fuller Hollow Creek Subwatershed

Four sites were sampled on the main stem in the Fuller Hollow Creek subwatershed. Water quality rated as good to fair at all four sites. FULL 3.5 received a score of excellent during the October and December sampling events.

FULL 0.5, FULL 1.5, and FULL 2.5 had a habitat rating of supporting due to a lack of riparian zone at all three sites, a lack of vegetative cover at FULL 0.5, extensive channel alteration, bank erosion, and bank instability at FULL 1.5, and bank erosion at FULL 2.5. FULL 3.5 had a score of excellent, and had the best riparian zone and stream banks of all four sites.

Biological scores showed a rating of moderate impairment for all four sites. "Number of common taxa" metrics were low at all sites, and most of the index scores were low, especially EPT Index scores. Except for the headwater region, all of Fuller Hollow Creek runs through a residential area.

The riparian zone along the lower three quarters of the creek is minimal, and, in some cases, backyards extend to the creek bank. One half-mile before Fuller Hollow Creek empties into the Susquehanna River, a discharge pipe releases unknown effluent into the creek. This discharge raises the conductivity of the creek substantially below the pipe. This sample site consistently has one of the highest conductivity readings of all the sample sites, including the river sites.

## Susquehanna and Chenango River Sites

Three sample sites were located on the main stems of the Susquehanna and Chenango Rivers. The site on the Chenango River is approximately one mile upstream of its confluence with the Susquehanna River. The two sites on the Susquehanna River bracket the Chenango River confluence. Due to the width of the rivers, three subsamples were collected at each site: one near the left bank; one in the middle of the river; and one near the right bank.

Water quality at the Chenango River site ranged from good to fair. The two Susquehanna River sites also ranged in score from good to fair, with one area of concern. The left bank subsample of the downstream Susquehanna River site consistently had an ammonia reading notably higher than all other river site subsamples in this study. It also had some of the highest readings for nitrites and nitrogen.

Immediately upstream of the subsample site is the Binghamton-Johnson City Joint Sewerage Treatment Plant (STP). The discharge from this STP is a possible explanation for the higher ammonia, nitrite, and nitrogen levels and poor water quality score for this subsample. Any STP in Broome County, N.Y., releasing municipal effluent into the Susquehanna River is in compliance with the NYSDEC, if it discharges no more than 20 mg/l (interim limit) of ammonia.

The ammonia levels recorded at the downstream Susquehanna River left bank subsample site for all six sampling events, did not exceed the 20 mg/l NYSDEC regulation. According to the NYSDEC Syracuse office, the Binghamton-Johnson City Joint STP is in compliance with state regulations, even though the subbasin water quality score assigned to the downstream subsample is fair to poor. Currently, there are no NYSDEC regulations for nitrites or nitrogen effluent releases from STPs.

# Conclusions

All twenty sites in the year-two Upper Susquehanna Subbasin Small Watershed Study had good water quality, except for the left bank subsample of the downstream Susquehanna River site. As discussed, this may be due to the Binghamton-Johnson City Joint STP upstream of the site.

According to the current study, Snake Creek was the subwatershed with the highest potential for watershed protection efforts. In general, it had biological communities, habitat, and water quality that all scored as nonimpaired. Snake Creek also was listed as one of the watersheds with the highest potential for watershed protection efforts in the year-one report of the Upper Susquehanna Subbasin Survey. Protecting this nonimpaired watershed should be a priority of environmental agencies and local watershed associations.

Areas for concern include Little Snake Creek and Fuller Hollow Creek subwatersheds. Little Snake Creek had macroinvertebrate communities that scored as moderately and slightly impaired, while water quality scores were good to excellent. One possible explanation for the impaired macroinvertebrate communities relates to habitat conditions. At LSNK 0.1, the stream showed signs of heavy equipment dredging. Major streambed disruption of this kind degrades the habitat for macroinvertebrate communities and other aquatic life. Reestablishing the riparian vegetation along areas of this stream also may increase the macroinvertebrate and habitat scores for this subwatershed.

Fuller Hollow Creek also is an area of concern. All four sample sites had moderately impaired biological communities, and three had supporting habitat scores. FULL 3.5 had habitat and water quality scores of excellent, but it also had the best riparian zone of the four sites. Reestablishing the riparian vegetation, where possible along the creek's length, would help raise the habitat, water quality, and possibly the macroinvertebrate scores for Fuller Hollow Creek. Additional sampling may be needed to support and document remediation efforts.

SRBC will provide the data and information contained in this report to local groups and agencies that are working in these watersheds. This information can be used to enhance grant applications that support watershed protection, restoration, and enhancement.

# Appendix

*Table A1. Water Quality Raw Data Field Analysis for Upper Susquehanna Streams, 2000*

| Station | Date (yyyymmdd) | Time (hhmm) | Flow (cfs) | Water Temperature (degree Centigrade) | pH | Dissolved Oxygen (mg/l) | Conductance (µmhos/cm) | Alkalinity (mg/l) | Acidity (mg/l) |
|---|---|---|---|---|---|---|---|---|---|
| FABR 0.5 | 19991025 | 1340 | 3.989 | 7.9 | 7.30 | 6.46 | 82 | 24 | 6 |
| SNAK 11.5 | 19991025 | 1150 | 7.599 | 8.3 | 7.20 | 6.68 | 113 | 24 | 6 |
| SNAK 8.5 | 19991025 | 1230 | 12.271 | 8.8 | 7.45 | 6.69 | 99 | 22 | 4 |
| SNAK5.4 | 19991025 | 1530 | 26.430 | 10.1 | 7.25 | 6.52 | 97 | 24 | 6 |
| SNAK0.1 | 19991026 | 1445 | 31.641 | 9.4 | 7.40 | 6.13 | 100 | 22 | 4 |
| SILV4.1 | 19991025 | 1415 | 1.883 | 8.0 | 7.30 | 6.55 | 86 | 20 | 6 |
| SILV 0.1 | 19991025 | 1300 | 15.601 | 8.1 | 7.30 | 6.90 | 89 | 20 | 4 |
| JONS0.1 | 19991025 | 1445 | NA | 8.4 | 7.10 | 6.26 | 54 | 12 | 4 |
| RHIN3.5 | 19991025 | 1610 | 2.823 | 9.0 | 7.30 | 6.51 | 84 | 26 | 4 |
| RHIN0.1 | 19991026 | 1530 | 2.621 | 8.5 | 7.00 | 6.09 | 91 | 22 | 4 |
| LSNAK5.0 | 19991027 | 900 | 7.169 | 6.6 | 7.10 | 6.31 | 128 | 18 | 2 |
| LSNAK0.1 | 19991027 | 1100 | 11.289 | 7.1 | 7.20 | 6.30 | 139 | 18 | 2 |
| WFLS0.1 | 19991027 | 1000 | 2.809 | 6.4 | 7.30 | 6.89 | 161 | 26 | 4 |
| FULL3.5 | 19991027 | 1315 | NA | 6.7 | 6.95 | 5.92 | 137 | 36 | 2 |
| FULL2.5 | 19991027 | 1200 | NA | 8.0 | 7.85 | 6.68 | 283 | 106 | 4 |
| FULL1.5 | 19991027 | 1130 | NA | 8.1 | 8.30 | 7.10 | 321 | 114 | 0 |
| FULL0.5 | 19991026 | 1630 | NA | 13.5 | 8.20 | 5.72 | 1,397 | 154 | 2 |
| SUSQ1A | 19991027 | 1400 | NA | 9.6 | 7.65 | 6.43 | 265 | 74 | 4 |
| SUSQ1B | 19991027 | 1430 | NA | 8.6 | 7.50 | 6.33 | 187 | 54 | 4 |
| SUSQ1C | 19991027 | 1500 | NA | 8.5 | 8.00 | 6.24 | 251 | 80 | 2 |
| SUSQ2A | 19991026 | 0800 | NA | 7.5 | 7.80 | 6.19 | 180 | 58 | 4 |
| SUSQ2B | 19991026 | 0830 | NA | 7.4 | 7.80 | 6.22 | 178 | 56 | 4 |
| SUSQ2C | 19991026 | 0915 | NA | 7.4 | 7.70 | 6.20 | 179 | 58 | 4 |
| CHEN1A | 19991026 | 1115 | NA | 8.1 | 7.90 | 6.47 | 305 | 102 | 2 |
| CHEN1B | 19991026 | 1045 | NA | 8.3 | 8.00 | 6.50 | 303 | 102 | 2 |
| CHEN1C | 19991026 | 1015 | NA | 8.2 | 8.00 | 6.53 | 304 | 100 | 2 |

*Table A1. Water Quality Raw Data Field Analysis for Upper Susquehanna Streams, 2000—Continued*

| Station | Date (yyyymmdd) | Time (hhmm) | Flow (cfs) | Water Temperature (degree Centigrade) | pH | Dissolved Oxygen (mg/l) | Conductance (µmhos/cm) | Alkalinity (mg/l) | Acidity (mg/l) |
|---|---|---|---|---|---|---|---|---|---|
| FABR 0.5 | 19991206 | 1515 | 16.208 | 7.7 | 6.75 | 6.37 | 72 | 16 | 6 |
| SNAK11.5 | 19991206 | 1445 | 9.998 | 7.8 | 6.90 | 6.49 | 106 | 22 | 4 |
| SNAK8.5 | 19991206 | 1330 | 25.950 | 8.2 | 7.10 | 6.55 | 89 | 20 | 4 |
| SNAK5.4 | 19991206 | 1645 | 72.303 | 7.8 | 6.85 | 6.57 | 84 | 16 | 6 |
| SNAK0.1 | 19991207 | 0830 | 69.998 | 5.7 | 7.25 | 6.27 | 85 | 18 | 2 |
| SILV4.1 | 19991206 | 1545 | 9.207 | 7.7 | 6.75 | 6.53 | 76 | 14 | 6 |
| SILV0.1 | 19991206 | 1400 | 38.759 | 7.5 | 6.80 | 6.59 | 78 | 14 | 4 |
| JONS0.1 | 19991206 | 1615 | NA | 7.1 | 6.35 | 6.47 | 22 | 12 | 8 |
| RHIN3.5 | 19991206 | 1715 | 8.722 | 7.2 | 6.80 | 6.46 | 60 | 24 | 4 |
| RHIN0.1 | 19991207 | 0930 | 10.927 | 5.2 | 7.10 | 6.15 | 81 | 18 | 4 |
| LSNK5.0 | 19991207 | 1100 | 12.204 | 5.3 | 6.82 | 6.17 | 105 | 14 | 4 |
| LSNAK0.1 | 19991207 | 0800 | 25.236 | 5.2 | 7.23 | 6.73 | 35 | 20 | 2 |
| WFLS0.1 | 19991207 | 1030 | 14.441 | 5.1 | 6.68 | 6.14 | 124 | 16 | 4 |
| FULL3.5 | 19991208 | 1100 | NA | 2.9 | 7.15 | 6.49 | 120 | 26 | 6 |
| FULL2.5 | 19991208 | 1030 | NA | 3.3 | 7.20 | 6.97 | 210 | 58 | 4 |
| FULL1.5 | 19991208 | 1130 | NA | 3.4 | 7.60 | 6.59 | 196 | 60 | 4 |
| FULL0.5 | 19991208 | 0945 | NA | 3.2 | 8.00 | 6.77 | 307 | 66 | 2 |
| SUSQ1A | 19991207 | 1400 | NA | 4.9 | 7.30 | 6.60 | 183 | 50 | 4 |
| SUSQ1B | 19991207 | 1415 | NA | 4.4 | 7.25 | 6.75 | 154 | 48 | 4 |
| SUSQ1C | 19991207 | 1430 | NA | 4.4 | 7.25 | 6.61 | 196 | 58 | 4 |
| SUSQ2A | 19991207 | 1145 | NA | 5.0 | 7.05 | 6.54 | 137 | 38 | 4 |
| SUSQ2B | 19991207 | 1200 | NA | 5.0 | 7.10 | 6.59 | 136 | 40 | 4 |
| SUSQ2C | 19991207 | 1215 | NA | 5.0 | 7.10 | 6.55 | 149 | 38 | 4 |
| CHEN1A | 19991208 | 0915 | NA | 4.5 | 7.70 | 5.91 | 202 | 56 | 2 |
| CHEN1B | 19991208 | 0845 | NA | 4.3 | 7.65 | 6.31 | 198 | 54 | 2 |
| CHEN1C | 19991208 | 0815 | NA | 4.1 | 7.70 | 6.33 | 196 | 56 | 2 |

*Table A1. Water Quality Raw Data Field Analysis for Upper Susquehanna Streams, 2000—Continued*

| Station | Date (yyyymmdd) | Time (hhmm) | Flow (cfs) | Water Temperature (degree Centigrade) | pH | Dissolved Oxygen (mg/l) | Conductance (µmhos/cm) | Alkalinity (mg/l) | Acidity (mg/l) |
|---|---|---|---|---|---|---|---|---|---|
| FABR0.5 | 20000221 | 1500 | 19.771 | 0.7 | 6.90 | 7.05 | 77 | 20 | 6 |
| SNAK11.5 | 20000221 | 1130 | 11.181 | 0.6 | 6.95 | 6.90 | 119 | 16 | 4 |
| SNAK8.5 | 20000221 | 1225 | 28.884 | 0.7 | 6.95 | 7.11 | 99 | 16 | 4 |
| SNAK5.4 | 20000221 | 1610 | 74.886 | 1.2 | 6.85 | 6.92 | 92 | 20 | 6 |
| SNAK0.1 | 20000221 | 1015 | 88.211 | 0.7 | 6.90 | 7.10 | 91 | 14 | 4 |
| SILV4.1 | 20000221 | 1405 | 10.399 | 0.7 | 6.65 | 6.99 | 84 | 16 | 6 |
| SILV0.1 | 20000221 | 1310 | 45.171 | 0.6 | 6.70 | 7.26 | 84 | 14 | 4 |
| JONS0.1 | 20000221 | 1655 | NA | 1.3 | 6.30 | 6.79 | 41 | 16 | 6 |
| RHIN3.5 | 20000222 | 0930 | 9.591 | 0.8 | 6.70 | 6.62 | 62 | 30 | 4 |
| RHIN0.1 | 20000222 | 0805 | 11.368 | 0.7 | 6.90 | 7.02 | 77 | 16 | 4 |
| LSNAK5.0 | 20000222 | 1110 | 13.343 | 1.1 | 6.90 | 7.19 | 107 | 20 | 6 |
| LSNAK0.1 | 20000221 | 0925 | 32.664 | 0.5 | 7.05 | 7.61 | 130 | 16 | 2 |
| WFLS0.1 | 20000222 | 1215 | 15.383 | 0.9 | 6.85 | 7.14 | 139 | 20 | 4 |
| FULL3.5 | 20000223 | 0945 | NA | 2.3 | 7.00 | 6.50 | 121 | 20 | 4 |
| FULL2.5 | 20000223 | 0850 | NA | 2.3 | 7.35 | 7.04 | 219 | 40 | 4 |
| FULL1.5 | 20000223 | 0810 | NA | 2.1 | 7.40 | 6.88 | 341 | 44 | 4 |
| FULL0.5 | 20000223 | 1030 | NA | 3.7 | 7.50 | 6.35 | 404 | 50 | 4 |
| SUSQ1A | 20000223 | 1130 | NA | 1.3 | 7.15 | 6.46 | 242 | 58 | 6 |
| SUSQ2A | 20000222 | 1530 | NA | 0.8 | 7.15 | 6.95 | 156 | 40 | 6 |
| SUSQ2B | 20000222 | 1600 | NA | 0.8 | 7.10 | 6.70 | 158 | 38 | 6 |
| CHEN1A | 20000222 | 1445 | NA | 0.7 | 7.50 | 6.50 | 254 | 72 | 4 |
| CHEN1B | 20000222 | 1415 | NA | 0.6 | 7.65 | 6.53 | 255 | 78 | 4 |
| CHEN1C | 20000222 | 1345 | NA | 0.2 | 7.40 | 6.47 | 229 | 68 | 2 |

*Table A1. Water Quality Raw Data Field Analysis for Upper Susquehanna Streams, 2000—Continued*

| Station | Date (yyyymmdd) | Time (hhmm) | Flow (cfs) | Water Temperature (degree Centigrade) | pH | Dissolved Oxygen (mg/l) | Conductance (µmhos/cm) | Alkalinity (mg/l) | Acidity (mg/l) |
|---|---|---|---|---|---|---|---|---|---|
| FABR0.5 | 20000419 | 0945 | NA | 6.3 | 6.40 | 5.59 | 54 | 10 | 4 |
| SNAK11.5 | 20000418 | 1055 | NA | 7.9 | 6.80 | 5.81 | 92 | 14 | 4 |
| SNAK8.5 | 20000418 | 1130 | NA | 6.5 | 6.30 | 5.26 | 72 | 10 | 4 |
| SNAK5.4 | 20000419 | 1130 | NA | 7.2 | 6.40 | 5.18 | 63 | 10 | 4 |
| SNAK0.1 | 20000418 | 1020 | NA | 6.7 | 6.60 | 5.62 | 68 | 13 | 4 |
| SILV4.1 | 20000419 | 1030 | NA | 6.7 | 6.40 | 5.48 | 56 | 8 | 4 |
| SILV0.1 | 20000419 | 0900 | NA | 6.5 | 6.65 | 5.94 | 56 | 10 | 6 |
| JONS0.1 | 20000419 | 1100 | NA | 7.1 | 6.30 | 4.67 | 38 | 8 | 4 |
| RHIN3.5 | 20000419 | 1300 | NA | 7.7 | 6.30 | 5.00 | 45 | 8 | 4 |
| RHIN0.1 | 20000419 | 1200 | NA | 7.2 | 6.60 | 5.65 | 52 | 10 | 4 |
| LSNAK5.0 | 20000419 | 1345 | NA | 7.2 | 6.40 | 5.42 | 72 | 10 | 6 |
| LSNAK0.1 | 20000418 | 1005 | NA | 6.5 | 7.00 | 6.01 | 87 | 16 | 6 |
| WFLS0.1 | 20000419 | 1415 | NA | 7.2 | 6.50 | 5.17 | 77 | 14 | 4 |
| FULL 3.5 | 20000417 | 1030 | NA | 8.1 | 6.85 | 5.53 | 93 | 26 | 4 |
| FULL2.5 | 20000417 | 1110 | NA | 7.9 | 7.40 | 5.68 | 150 | 42 | 4 |
| FULL1.5 | 20000417 | 1310 | NA | 9.0 | 7.50 | 5.52 | 280 | 52 | 2 |
| FULL0.5 | 20000417 | 1345 | NA | 9.0 | 7.55 | 5.58 | 261 | 54 | 2 |
| SUSQ1A | 20000418 | 1215 | NA | 8.3 | 7.00 | 5.38 | 173 | 44 | 4 |
| SUSQ1B | 20000418 | 1230 | NA | 8.2 | 7.15 | 5.27 | 141 | 46 | 4 |
| SUSQ1C | 20000418 | 1245 | NA | 8.1 | 7.45 | 5.31 | 184 | 54 | 4 |
| SUSQ2A | 20000418 | 0940 | NA | 7.8 | 7.35 | 5.22 | 137 | 44 | 4 |
| SUSQ2B | 20000418 | 0915 | NA | 8.3 | 7.30 | 5.31 | 140 | 44 | 4 |
| SUSQ2C | 20000418 | 0845 | NA | 8.7 | 7.20 | 5.39 | 144 | 42 | 4 |
| CHEN1A | 20000417 | 1600 | NA | 10.0 | 7.55 | 5.35 | 211 | 68 | 4 |
| CHEN1B | 20000417 | 1515 | NA | 10.1 | 7.65 | 5.38 | 216 | 64 | 4 |
| CHEN1C | 20000417 | 1430 | NA | 10.2 | 7.50 | 5.33 | 228 | 64 | 4 |

*Table A1. Water Quality Raw Data Field Analysis for Upper Susquehanna Streams, 2000—Continued*

| Station | Date (yyyymmdd) | Time (hhmm) | Flow (cfs) | Water Temperature (degree Centigrade) | pH | Dissolved Oxygen (mg/l) | Conductance (µmhos/cm) | Alkalinity (mg/l) | Acidity (mg/l) |
|---|---|---|---|---|---|---|---|---|---|
| FABR0.5 | 20000605 | 1330 | 9.735 | 12.4 | 6.90 | 6.28 | 73 | 20 | 2 |
| SNAK11.5 | 20000605 | 1125 | 7.900 | 13.0 | 7.00 | 5.81 | 113 | 30 | 4 |
| SNAK8.5 | 20000605 | 1245 | 12.627 | 13.2 | 7.00 | 6.41 | 98 | 26 | 4 |
| SNAK5.4 | 20000606 | 0930 | NA | 11.7 | 6.75 | 6.44 | 86 | 22 | 2 |
| SNAK0.1 | 20000606 | 0830 | 94.887 | 12.2 | 6.90 | 6.37 | 86 | 22 | 4 |
| SILV4.1 | 20000605 | 1430 | 4.241 | 12.6 | 6.80 | 6.06 | 78 | 14 | 6 |
| SILV0.1 | 20000605 | 1215 | 18.060 | 12.7 | 6.90 | 6.15 | 78 | 20 | 2 |
| JONS0.1 | 20000605 | 1530 | NA | 11.8 | 6.50 | 6.25 | 47 | 10 | 2 |
| RHIN3.5 | 20000606 | 1200 | 17.170 | 11.7 | 6.60 | 6.10 | 69 | 18 | 4 |
| RHIN0.1 | 20000606 | 1045 | 26.242 | 12.0 | 6.95 | 6.26 | 80 | 22 | 2 |
| LSNK5.0 | 20000606 | 1400 | 21.299 | 12.1 | 6.95 | 6.37 | 106 | 22 | 4 |
| LSNK0.1 | 20000606 | 1500 | 50.368 | 12.7 | 7.05 | 6.34 | 113 | 24 | 4 |
| WFLS0.1 | 20000606 | 1300 | 26.475 | 12.1 | 7.05 | 6.37 | 130 | 24 | 4 |
| FULL3.5 | 20000607 | 1145 | NA | 12.4 | 7.40 | 5.63 | 120 | 46 | 2 |
| FULL2.5 | 20000607 | 1115 | NA | 11.8 | 7.65 | 5.98 | 184 | 60 | 2 |
| FULL1.5 | 20000607 | 1215 | NA | 15.3 | 8.25 | 5.88 | 220 | 70 | 2 |
| FULL0.5 | 20000607 | 1100 | NA | 13.2 | 8.30 | 6.12 | 279 | 74 | 0 |
| SUSQ1A | 20000607 | 1245 | NA | 15.8 | 7.65 | 5.66 | 191 | 56 | 2 |
| SUSQ1B | 20000607 | 1300 | NA | 16.4 | 7.70 | 5.36 | 184 | 58 | 2 |
| SUSQ1C | 20000607 | 1315 | NA | 15.9 | 8.00 | 5.58 | 258 | 82 | 2 |
| SUSQ2A | 20000607 | 0930 | NA | 13.8 | 7.40 | 5.26 | 175 | 64 | 4 |
| SUSQ2B | 20000607 | 1000 | NA | 13.7 | 7.50 | 5.40 | 175 | 56 | 4 |
| SUSQ2C | 20000607 | 1035 | NA | 13.8 | 7.40 | 5.53 | 179 | 58 | 4 |
| CHEN1A | 20000607 | 0900 | NA | 12.5 | 7.70 | NA | 279 | 90 | 2 |
| CHEN1B | 20000607 | 0815 | NA | 12.4 | 7.60 | NA | 280 | 92 | 2 |
| CHEN1C | 20000607 | 0730 | NA | 12.7 | 7.70 | NA | 282 | 98 | 2 |

*Table A1. Water Quality Raw Data Field Analysis for Upper Susquehanna Streams, 2000—Continued*

| Station | Date (yyyymmdd) | Time (hhmm) | Flow (cfs) | Water Temperature (degree Centigrade) | pH | Dissolved Oxygen (mg/l) | Conductance (µmhos/cm) | Alkalinity (mg/l) | Acidity (mg/l) |
|---|---|---|---|---|---|---|---|---|---|
| FABR0.5 | 20000828 | 1315 | 0.656 | 17.4 | 7.70 | 5.50 | 114 | 42 | 2 |
| SNAK11.5 | 20000828 | 1120 | 1.352 | 17.3 | 7.40 | 5.34 | 151 | 46 | 4 |
| SNAK8.5 | 20000828 | 1200 | 1.258 | 19.1 | 8.10 | 5.48 | 139 | 42 | 2 |
| SNAK5.4 | 20000829 | 0945 | 3.465 | 18.7 | 7.40 | 4.80 | 128 | 32 | 2 |
| SNAK0.1 | 20000829 | 0830 | 3.792 | 18.7 | 7.40 | 5.40 | 122 | 34 | 2 |
| SILV4.1 | 20000828 | 1415 | 0.393 | 19.1 | 7.55 | 5.26 | 104 | 54 | 2 |
| SILV0.1 | 20000828 | 1230 | 1.932 | 18.6 | 7.60 | 5.97 | 130 | 34 | 2 |
| JONS0.1 | 20000828 | 1500 | NA | 17.7 | 7.20 | 4.89 | 71 | 22 | 4 |
| RHIN3.5 | 20000829 | 1130 | 0.422 | 21.7 | 7.95 | 5.39 | 159 | 52 | 2 |
| RHIN0.1 | 20000829 | 1045 | 0.221 | 18.5 | 7.75 | 5.61 | 129 | 42 | 2 |
| LSNK5.0 | 20000829 | 1225 | 0.218 | 19.7 | 7.50 | 5.39 | 133 | 34 | 2 |
| LSNK0.1 | 20000829 | 1410 | 0.720 | 21.5 | 7.65 | 5.11 | 159 | 36 | 2 |
| WFLS0.1 | 20000829 | 1315 | NA | 22.1 | 8.65 | 5.96 | 177 | 40 | 0 |
| FULL2.5 | 20000830 | 1220 | NA | 21.6 | 8.45 | 6.37 | 350 | 130 | 0 |
| FULL1.5 | 20000830 | 1300 | NA | 21.5 | 8.70 | 7.12 | 464 | 136 | 0 |
| SUSQ1A | 20000830 | 1100 | NA | 23.5 | 8.10 | 5.37 | 308 | 92 | 2 |
| SUSQ1B | 20000830 | 1120 | NA | 24.0 | 8.45 | 5.29 | 207 | 68 | 0 |
| SUSQ1C | 20000830 | 1140 | NA | 24.1 | 8.50 | 5.33 | 222 | 76 | 0 |
| SUSQ2A | 20000830 | 0930 | NA | 22.0 | 8.30 | 5.48 | 202 | 70 | 0 |
| SUSQ2B | 20000830 | 0950 | NA | 22.2 | 8.20 | 5.28 | 203 | 74 | 2 |
| SUSQ2C | 20000830 | 1005 | NA | 22.2 | 8.20 | 5.30 | 204 | 70 | 2 |
| CHEN1A | 20000830 | 0900 | NA | 21.1 | 8.20 | 5.15 | 388 | 126 | 2 |
| CHEN1B | 20000830 | 0845 | NA | 20.7 | 8.30 | 5.32 | 389 | 124 | 0 |
| CHEN1C | 20000830 | 0830 | NA | 21.2 | 8.20 | 5.17 | 383 | 124 | 2 |

*Table A2. Water Quality Raw Data Laboratory Analysis for Upper Susquehanna Streams, 2000*

| Station | Date (yyyymmdd) | Time (hhmm) | Total Residue (mg/l) | Total Suspended Solids (mg/l) | Total Nitrogen (mg/l) | Total Ammonia (mg/l) | Total Nitrite (mg/l) | Total Nitrate (mg/l) | Total Phosphorus (mg/l) | Total Organic Carbon (mg/l) | Total Ortho-phosphate (mg/l) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| FABR 0.5 | 19991025 | 1340 | 80 | 4 | 0.37 | 0.01 | 0.005 | 0.08 | 0.01 | 2.5 | 0.001 |
| SNAK 11.5 | 19991025 | 1150 | 90 | 1 | 0.52 | 0.01 | 0.005 | 0.10 | 0.03 | 3.2 | 0.001 |
| SNAK 8.5 | 19991025 | 1230 | 66 | 1 | 0.35 | 0.01 | 0.005 | 0.14 | 0.02 | 2.5 | 0.001 |
| SNAK5.4 | 19991025 | 1530 | 1 | 1 | 0.38 | 0.01 | 0.005 | 0.21 | 0.02 | 2.4 | 0.003 |
| SNAK0.1 | 19991026 | 1445 | 100 | 1 | 0.42 | 0.01 | NA | 0.12 | 0.01 | 2.1 | 0.004 |
| SILV4.1 | 19991025 | 1415 | 50 | 1 | 0.35 | 0.01 | 0.005 | 0.06 | 0.03 | 3.0 | 0.001 |
| SILV 0.1 | 19991025 | 1300 | 72 | 12 | 0.36 | 0.01 | 0.005 | 0.13 | 0.02 | 2.5 | 0.001 |
| JONS0.1 | 19991025 | 1445 | 24 | 1 | 0.24 | 0.01 | 0.005 | 0.02 | 0.03 | 1.9 | 0.001 |
| RHIN3.5 | 19991025 | 1610 | 50 | 1 | 0.28 | 0.01 | 0.005 | 0.02 | 0.03 | 3.2 | 0.004 |
| RHIN0.1 | 19991026 | 1530 | 98 | 1 | 0.30 | 0.01 | NA | 0.02 | 0.03 | 2.7 | 0.001 |
| LSNAK5.0 | 19991027 | 0900 | 122 | 1 | 0.26 | 0.01 | NA | 0.02 | 0.02 | 2.2 | 0.002 |
| LSNAK0.1 | 19991027 | 1100 | 110 | 12 | 0.29 | 0.01 | NA | 0.02 | 0.01 | 1.8 | 0.002 |
| WFLS0.1 | 19991027 | 1000 | 132 | 1 | 0.26 | 0.01 | NA | 0.02 | 0.02 | 2.1 | 0.001 |
| FULL3.5 | 19991027 | 1315 | 134 | 1 | 0.25 | 0.01 | NA | 0.02 | 0.01 | 3.0 | 0.003 |
| FULL2.5 | 19991027 | 1200 | 250 | 1 | 0.22 | 0.01 | NA | 0.02 | 0.04 | 2.5 | 0.010 |
| FULL1.5 | 19991027 | 1130 | 264 | 8 | 0.34 | 0.01 | NA | 0.08 | 0.03 | 2.6 | 0.002 |
| FULL0.5 | 19991026 | 1630 | 948 | 1 | 0.64 | 0.09 | NA | 0.21 | 0.03 | 1.8 | 0.003 |
| SUSQ1A | 19991027 | 1400 | 214 | 28 | 2.58 | 1.09 | NA | 0.18 | 0.31 | 4.3 | 0.083 |
| SUSQ1B | 19991027 | 1430 | 180 | 1 | 0.63 | 0.01 | NA | 0.19 | 0.06 | 3.0 | 0.007 |
| SUSQ1C | 19991027 | 1500 | 240 | 1 | 0.66 | 0.01 | NA | 0.26 | 0.04 | 3.2 | 0.003 |
| SUSQ2A | 19991026 | 0800 | 112 | 1 | 0.60 | 0.02 | 0.005 | 0.23 | 0.04 | 2.7 | 0.001 |
| SUSQ2B | 19991026 | 0830 | 88 | 1 | 0.58 | 0.01 | 0.005 | 0.25 | 0.04 | 2.7 | 0.001 |
| SUSQ2C | 19991026 | 0915 | 114 | 1 | 0.58 | 0.02 | 0.005 | 0.24 | 0.04 | 3.0 | 0.001 |
| CHEN1A | 19991026 | 1115 | 1 | 1 | 0.70 | 0.02 | 0.005 | 0.31 | 0.03 | 3.1 | 0.005 |
| CHEN1B | 19991026 | 1045 | 206 | 1 | 0.67 | 0.01 | 0.005 | 0.31 | 0.04 | 3.2 | 0.001 |
| CHEN1C | 19991026 | 1015 | 50 | 4 | 0.73 | 0.01 | 0.005 | 0.31 | 0.04 | 3.2 | 0.001 |

*Table A2. Water Quality Raw Data Laboratory Analysis for Upper Susquehanna Streams, 2000—Continued*

| Station | Date (yyyymmdd) | Time (hhmm) | Total Residue (mg/l) | Total Suspended Solids (mg/l) | Total Nitrogen (mg/l) | Total Ammonia (mg/l) | Total Nitrite (mg/l) | Total Nitrate (mg/l) | Total Phosphorus (mg/l) | Total Organic Carbon (mg/l) | Total Ortho-phosphate (mg/l) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| FABR 0.5 | 19991206 | 1515 | 66 | 1 | 0.67 | 0.02 | NA | 0.25 | 0.07 | 2.4 | 0.023 |
| SNAK11.5 | 19991206 | 1445 | 64 | 1 | 0.83 | 0.01 | NA | 0.35 | 0.04 | 3.0 | 0.022 |
| SNAK8.5 | 19991206 | 1330 | 70 | 1 | 0.69 | 0.04 | NA | 0.28 | 0.05 | 3.0 | 0.028 |
| SNAK5.4 | 19991206 | 1645 | 34 | 8 | 0.66 | 0.01 | NA | 0.23 | 0.05 | 2.5 | 0.022 |
| SNAK0.1 | 19991207 | 830 | 56 | 1 | 0.69 | 0.01 | NA | 0.30 | 0.10 | 2.4 | 0.027 |
| SILV4.1 | 19991206 | 1545 | 64 | 1 | 0.48 | 0.01 | NA | 0.12 | 0.04 | 3.2 | 0.025 |
| SILV0.1 | 19991206 | 1400 | 60 | 1 | 0.59 | 0.01 | NA | 0.51 | 0.08 | 2.5 | 0.028 |
| JONS0.1 | 19991206 | 1615 | 42 | 1 | 0.30 | 0.01 | NA | 0.84 | 0.10 | 1.8 | 0.022 |
| RHIN3.5 | 19991206 | 1715 | 52 | 1 | 0.35 | 0.09 | NA | 0.02 | 0.05 | 3.0 | 0.020 |
| RHIN0.1 | 19991207 | 0930 | 34 | 6 | 0.50 | 0.12 | NA | 0.18 | 0.05 | 2.7 | 0.025 |
| LSNK5.0 | 19991207 | 1100 | 58 | 1 | 0.35 | 0.08 | NA | 0.07 | 0.05 | 2.1 | 0.017 |
| LSNAK0.1 | 19991207 | 0800 | 68 | 10 | 0.56 | 0.06 | NA | 0.07 | 0.10 | 2.3 | 0.037 |
| WFLS0.1 | 19991207 | 1030 | 78 | 1 | 0.42 | 0.13 | NA | 0.07 | 0.07 | 2.5 | 0.021 |
| FULL3.5 | 19991208 | 1100 | 58 | 1 | 0.26 | 0.07 | NA | 0.02 | 0.05 | 2.3 | 0.005 |
| FULL2.5 | 19991208 | 1030 | 122 | 1 | 0.38 | 0.01 | NA | 0.10 | 0.04 | 2.4 | 0.011 |
| FULL1.5 | 19991208 | 1130 | 136 | 1 | 0.51 | 0.06 | NA | 0.13 | 0.09 | 3.7 | 0.005 |
| FULL0.5 | 19991208 | 0945 | 182 | 8 | 0.5 | 0.07 | NA | 0.12 | 0.07 | 3.4 | 0.017 |
| SUSQ1A | 19991207 | 1400 | 118 | 10 | 1.71 | 0.69 | NA | 0.44 | 0.18 | 3.3 | 0.050 |
| SUSQ1B | 19991207 | 1415 | 104 | 1 | 1.04 | 0.12 | NA | 0.52 | 0.11 | 3.1 | 0.032 |
| SUSQ1C | 19991207 | 1430 | 102 | 24 | 1.30 | 0.10 | NA | 0.66 | 0.09 | 3.5 | 0.028 |
| SUSQ2A | 19991207 | 1145 | 74 | 1 | 0.86 | 0.08 | NA | 0.46 | 0.09 | 2.7 | 0.023 |
| SUSQ2B | 19991207 | 1200 | 92 | 1 | 0.93 | 0.08 | NA | 0.46 | 0.07 | 2.9 | 0.023 |
| SUSQ2C | 19991207 | 1215 | 98 | 1 | 0.90 | 0.09 | NA | 0.47 | 0.07 | 2.9 | 0.036 |
| CHEN1A | 19991208 | 0915 | 120 | 16 | 1.33 | 0.01 | NA | 0.66 | 0.14 | 17.2 | 0.047 |
| CHEN1B | 19991208 | 0845 | 146 | 4 | 1.22 | 0.01 | NA | 0.66 | 0.08 | 3.3 | 0.024 |
| CHEN1C | 19991208 | 0815 | 134 | 1 | 1.22 | 0.01 | NA | 0.66 | 0.08 | 3.3 | 0.026 |

*Table A2. Water Quality Raw Data Laboratory Analysis for Upper Susquehanna Streams, 2000—Continued*

| Station | Date (yyyymmdd) | Time (hhmm) | Total Residue (mg/l) | Total Suspended Solids (mg/l) | Total Nitrogen (mg/l) | Total Ammonia (mg/l) | Total Nitrite (mg/l) | Total Nitrate (mg/l) | Total Phosphorus (mg/l) | Total Organic Carbon (mg/l) | Total Ortho-phosphate (mg/l) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| FABR0.5 | 20000221 | 1500 | 60 | 1 | 0.70 | 0.01 | 0.005 | 0.47 | 0.02 | 1.7 | 0.005 |
| SNAK11.5 | 20000221 | 1130 | 88 | 1 | 1.07 | 0.02 | 0.005 | 0.71 | 0.09 | 2.2 | 0.025 |
| SNAK8.5 | 20000221 | 1225 | 68 | 1 | 0.88 | 0.01 | 0.005 | 0.60 | 0.03 | 1.8 | 0.016 |
| SNAK5.4 | 20000221 | 1610 | 76 | 1 | 0.84 | 0.01 | 0.005 | 0.57 | 0.04 | 1.7 | 0.005 |
| SNAK0.1 | 20000221 | 1015 | 78 | 1 | 0.89 | 0.01 | 0.005 | 0.62 | 0.08 | 1.8 | 0.037 |
| SILV4.1 | 20000221 | 1405 | 60 | 1 | 0.57 | 0.01 | 0.005 | 0.31 | 0.02 | 2.2 | 0.015 |
| SILV0.1 | 20000221 | 1310 | 88 | 1 | 0.72 | 0.01 | 0.005 | 0.50 | 0.03 | 1.8 | 0.012 |
| JONS0.1 | 20000221 | 1655 | 40 | 1 | 0.22 | 0.01 | 0.005 | 0.11 | 0.03 | 1.6 | 0.005 |
| RHIN3.5 | 20000222 | 0930 | 54 | 1 | 0.45 | 0.01 | 0.005 | 0.26 | 0.04 | 1.9 | 0.028 |
| RHIN0.1 | 20000222 | 0805 | 82 | 1 | 0.87 | 0.01 | 0.005 | 0.54 | 0.04 | 2.1 | 0.012 |
| LSNAK5.0 | 20000222 | 1110 | 84 | 4 | 0.46 | 0.01 | 0.005 | 0.31 | 0.04 | 1.7 | 0.029 |
| LSNAK0.1 | 20000221 | 0925 | 86 | 1 | 0.55 | 0.01 | 0.005 | 0.36 | 0.04 | 1.8 | 0.005 |
| WFLS0.1 | 20000222 | 1215 | 116 | 1 | 0.52 | 0.01 | 0.005 | 0.32 | 0.04 | 1.8 | 0.034 |
| FULL3.5 | 20000223 | 0945 | 102 | 1 | 0.18 | 0.01 | 0.005 | 0.07 | 0.03 | 1.8 | 0.013 |
| FULL2.5 | 20000223 | 0850 | 150 | 1 | 0.43 | 0.01 | 0.005 | 0.28 | 0.04 | 1.8 | 0.022 |
| FULL1.5 | 20000223 | 0810 | 224 | 6 | 0.57 | 0.01 | 0.005 | 0.35 | 0.05 | 2.3 | 0.034 |
| FULL0.5 | 20000223 | 1030 | 258 | 1 | 0.70 | 0.01 | 0.005 | 0.39 | 0.03 | 2.3 | 0.026 |
| SUSQ1A | 20000223 | 1130 | 210 | 28 | 1.55 | 0.21 | 0.020 | 0.58 | 0.20 | 2.7 | 0.048 |
| SUSQ2A | 20000222 | 1530 | 120 | 10 | 1.03 | 0.03 | 0.005 | 0.63 | 0.05 | 2.0 | 0.015 |
| SUSQ2B | 20000222 | 1600 | 126 | 1 | 1.00 | 0.03 | 0.005 | 0.63 | 0.05 | 2.1 | 0.045 |
| CHEN1A | 20000222 | 1445 | 176 | 4 | 1.43 | 0.02 | 0.005 | 0.97 | 0.06 | 2.2 | 0.014 |
| CHEN1B | 20000222 | 1415 | 196 | 1 | 1.42 | 0.03 | 0.005 | 0.96 | 0.05 | 2.2 | 0.018 |
| CHEN1C | 20000222 | 1345 | 180 | 1 | 1.39 | 0.03 | 0.005 | 0.93 | 0.04 | 2.3 | 0.017 |

*Table A2. Water Quality Raw Data Laboratory Analysis for Upper Susquehanna Streams, 2000—Continued*

| Station | Date (yyyymmdd) | Time (hhmm) | Total Residue (mg/l) | Total Suspended Solids (mg/l) | Total Nitrogen (mg/l) | Total Ammonia (mg/l) | Total Nitrite (mg/l) | Total Nitrate (mg/l) | Total Phosphorus (mg/l) | Total Organic Carbon (mg/l) | Total Ortho-phosphate (mg/l) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| FABR0.5 | 20000419 | 0945 | 60 | 4 | 0.64 | 0.04 | 0.005 | 0.31 | 0.02 | 2.4 | 0.027 |
| SNAK11.5 | 20000418 | 1055 | 290 | 194 | 1.34 | 0.05 | 0.020 | 0.32 | 0.29 | 4.4 | 0.080 |
| SNAK8.5 | 20000418 | 1130 | 198 | 144 | 1.04 | 0.02 | 0.010 | 0.21 | 0.16 | 3.8 | 0.066 |
| SNAK5.4 | 20000419 | 1130 | 72 | 12 | 0.61 | 0.06 | 0.005 | 0.30 | 0.02 | 2.4 | 0.023 |
| SNAK0.1 | 20000418 | 1020 | 100 | 26 | 0.59 | 0.03 | 0.010 | 0.21 | 0.05 | 2.9 | 0.051 |
| SILV4.1 | 20000419 | 1030 | 68 | 24 | 0.51 | 0.05 | 0.005 | 0.21 | 0.03 | 2.6 | 0.029 |
| SILV0.1 | 20000419 | 0900 | 130 | 18 | 0.66 | 0.02 | 0.005 | 0.28 | 0.05 | 2.5 | 0.036 |
| JONS0.1 | 20000419 | 1100 | 48 | 1 | 0.27 | 0.05 | 0.005 | 0.07 | 0.02 | 1.9 | 0.025 |
| RHIN3.5 | 20000419 | 1300 | 56 | 16 | 0.43 | 0.05 | 0.005 | 0.02 | 0.02 | 2.7 | 0.019 |
| RHIN0.1 | 20000419 | 1200 | 76 | 12 | 0.56 | 0.05 | 0.005 | 0.25 | 0.06 | 2.6 | 0.040 |
| LSNAK5.0 | 20000419 | 1345 | 68 | 20 | 0.48 | 0.06 | 0.005 | 0.17 | 0.04 | 2.5 | 0.042 |
| LSNAK0.1 | 20000418 | 1005 | 328 | 128 | 0.53 | 0.01 | 0.005 | 0.12 | 0.18 | 3.1 | 0.170 |
| WFLS0.1 | 20000419 | 1415 | 82 | 36 | 0.45 | 0.03 | 0.010 | 0.15 | 0.03 | 2.6 | 0.016 |
| FULL 3.5 | 20000417 | 1030 | 80 | 6 | 0.43 | 0.11 | 0.005 | 0.02 | 0.03 | 3.0 | 0.019 |
| FULL2.5 | 20000417 | 1110 | 232 | 8 | 0.58 | 0.11 | 0.005 | 0.15 | 0.03 | 3.2 | 0.022 |
| FULL1.5 | 20000417 | 1310 | 212 | 8 | 1.04 | 0.08 | 0.010 | 0.35 | 0.05 | 6.4 | 0.052 |
| FULL0.5 | 20000417 | 1345 | 172 | 1 | 0.96 | 0.07 | 0.010 | 0.39 | 0.04 | 5.7 | 0.045 |
| SUSQ1A | 20000418 | 1215 | 188 | 40 | 1.30 | 0.32 | 0.020 | 0.39 | 0.14 | 3.3 | 0.056 |
| SUSQ1B | 20000418 | 1230 | 144 | 42 | 0.93 | 0.06 | 0.010 | 0.49 | 0.05 | 2.7 | 0.036 |
| SUSQ1C | 20000418 | 1245 | 158 | 18 | 1.20 | 0.06 | 0.005 | 0.73 | 0.03 | 2.7 | 0.022 |
| SUSQ2A | 20000418 | 0940 | 124 | 38 | 0.88 | 0.03 | 0.005 | 0.46 | 0.04 | 2.7 | 0.038 |
| SUSQ2B | 20000418 | 0915 | 132 | 30 | 0.88 | 0.02 | 0.010 | 0.46 | 0.04 | 2.7 | 0.027 |
| SUSQ2C | 20000418 | 0845 | 132 | 32 | 0.91 | 0.02 | 0.005 | 0.49 | 0.04 | 2.8 | 0.029 |
| CHEN1A | 20000417 | 1600 | 164 | 14 | 1.52 | 0.05 | 0.005 | 0.98 | 0.04 | 3.2 | 0.014 |
| CHEN1B | 20000417 | 1515 | 170 | 1 | 1.49 | 0.06 | 0.005 | 0.97 | 0.04 | 3.1 | 0.016 |
| CHEN1C | 20000417 | 1430 | 188 | 32 | 1.44 | 0.05 | 0.005 | 0.94 | 0.04 | 2.8 | 0.020 |

*Table A2. Water Quality Raw Data Laboratory Analysis for Upper Susquehanna Streams, 2000—Continued*

| Station | Date (yyyymmdd) | Time (hhmm) | Total Residue (mg/l) | Total Suspended Solids (mg/l) | Total Nitrogen (mg/l) | Total Ammonia (mg/l) | Total Nitrite (mg/l) | Total Nitrate (mg/l) | Total Phosphorus (mg/l) | Total Organic Carbon (mg/l) | Total Ortho-phosphate (mg/l) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| FABR0.5 | 20000605 | 1330 | 74 | 1 | 0.48 | 0.01 | 0.005 | 0.22 | 0.02 | 2.2 | 0.005 |
| SNAK11.5 | 20000605 | 1125 | 72 | 1 | 0.62 | 0.01 | 0.005 | 0.26 | 0.02 | 2.9 | 0.005 |
| SNAK8.5 | 20000605 | 1245 | 66 | 4 | 0.32 | 0.01 | 0.005 | 0.08 | 0.02 | 2.2 | 0.018 |
| SNAK5.4 | 20000606 | 0930 | 100 | 6 | 0.56 | 0.01 | 0.005 | 0.27 | 0.03 | 2.7 | 0.020 |
| SNAK0.1 | 20000606 | 0830 | 3,114 | 16 | 0.03 | 0.01 | 0.005 | 0.02 | 0.03 | 2.3 | 0.034 |
| SILV4.1 | 20000605 | 1430 | 54 | 6 | 0.50 | 0.01 | 0.005 | 0.18 | 0.02 | 3.3 | 0.018 |
| SILV0.1 | 20000605 | 1215 | 54 | 1 | 0.34 | 0.01 | 0.005 | 0.09 | 0.02 | 2.1 | 0.005 |
| JONS0.1 | 20000605 | 1530 | 56 | 1 | 0.31 | 0.01 | 0.005 | 0.13 | 0.02 | 1.5 | 0.013 |
| RHIN3.5 | 20000606 | 1200 | 74 | 8 | 0.53 | 0.01 | 0.005 | 0.11 | 0.05 | 5.0 | 0.031 |
| RHIN0.1 | 20000606 | 1045 | 66 | 10 | 0.63 | 0.01 | 0.005 | 0.22 | 0.05 | 4.0 | 0.031 |
| LSNK5.0 | 20000606 | 1400 | 72 | 1 | 0.37 | 0.01 | 0.005 | 0.09 | 0.02 | 2.9 | 0.010 |
| LSNK0.1 | 20000606 | 1500 | 64 | 1 | 0.26 | 0.01 | 0.005 | 0.04 | 0.02 | 2.3 | 0.025 |
| WFLS0.1 | 20000606 | 1300 | 94 | 1 | 0.47 | 0.01 | 0.005 | 0.12 | 0.02 | 3.5 | 0.012 |
| FULL3.5 | 20000607 | 1145 | 96 | 8 | 0.36 | 0.01 | 0.005 | 0.02 | 0.04 | 3.3 | 0.023 |
| FULL2.5 | 20000607 | 1115 | 130 | 1 | 0.50 | 0.01 | 0.005 | 0.21 | 0.02 | 3.2 | 0.010 |
| FULL1.5 | 20000607 | 1215 | 168 | 1 | 0.57 | 0.01 | 0.005 | 0.17 | 0.04 | 4.3 | 0.023 |
| FULL0.5 | 20000607 | 1100 | 164 | 1 | 0.54 | 0.01 | 0.005 | 0.19 | 0.03 | 3.6 | 0.028 |
| SUSQ1A | 20000607 | 1245 | 142 | 20 | 1.24 | 0.13 | 0.010 | 0.44 | 0.04 | 3.4 | 0.027 |
| SUSQ1B | 20000607 | 1300 | 122 | 6 | 0.91 | 0.01 | 0.005 | 0.47 | 0.03 | 3.0 | 0.021 |
| SUSQ1C | 20000607 | 1315 | 52 | 4 | 1.26 | 0.01 | 0.010 | 0.81 | 0.02 | 3.0 | 0.021 |
| SUSQ2A | 20000607 | 0930 | 152 | 54 | 1.01 | 0.01 | 0.005 | 0.44 | 0.06 | 3.7 | 0.020 |
| SUSQ2B | 20000607 | 1000 | 114 | 1 | 0.82 | 0.01 | 0.010 | 0.44 | 0.03 | 2.8 | 0.018 |
| SUSQ2C | 20000607 | 1035 | 112 | 4 | 0.83 | 0.01 | 0.005 | 0.44 | 0.03 | 2.8 | 0.027 |
| CHEN1A | 20000607 | 0900 | 180 | 12 | 1.44 | 0.01 | 0.010 | 0.91 | 0.03 | 3.2 | 0.016 |
| CHEN1B | 20000607 | 0815 | 174 | 8 | 1.44 | 0.01 | 0.010 | 0.92 | 0.04 | 3.2 | 0.017 |
| CHEN1C | 20000607 | 0730 | 174 | 6 | 1.39 | 0.01 | 0.010 | 0.91 | 0.03 | 2.9 | 0.018 |

*Table A2. Water Quality Raw Data Laboratory Analysis for Upper Susquehanna Streams, 2000—Continued*

| Station | Date (yyyymmdd) | Time (hhmm) | Total Residue (mg/l) | Total Suspended Solids (mg/l) | Total Nitrogen (mg/l) | Total Ammonia (mg/l) | Total Nitrite (mg/l) | Total Nitrate (mg/l) | Total Phosphorus (mg/l) | Total Organic Carbon (mg/l) | Total Ortho-phosphate (mg/l) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| FABR0.5 | 20000828 | 1315 | 64 | 1 | 0.41 | 0.01 | 0.005 | 0.12 | 0.02 | 2.0 | 0.011 |
| SNAK11.5 | 20000828 | 1120 | 80 | 18 | 0.61 | 0.01 | 0.005 | 0.30 | 0.03 | 2.3 | 0.021 |
| SNAK8.5 | 20000828 | 1200 | 76 | 10 | 0.36 | 0.01 | 0.005 | 0.08 | 0.02 | 2.0 | 0.014 |
| SNAK5.4 | 20000829 | 0945 | 54 | 12 | 0.56 | 0.01 | 0.005 | 0.26 | 0.01 | 1.7 | 0.005 |
| SNAK0.1 | 20000829 | 0830 | 54 | 1 | 0.40 | 0.01 | 0.005 | 0.13 | 0.02 | 1.7 | 0.015 |
| SILV4.1 | 20000828 | 1415 | 64 | 10 | 0.48 | 0.01 | 0.005 | 0.16 | 0.02 | 2.9 | 0.028 |
| SILV0.1 | 20000828 | 1230 | 94 | 12 | 0.35 | 0.01 | 0.005 | 0.02 | 0.01 | 1.6 | 0.014 |
| JONS0.1 | 20000828 | 1500 | 42 | 10 | 0.65 | 0.01 | 0.005 | 0.36 | 0.02 | 1.5 | 0.022 |
| RHIN3.5 | 20000829 | 1130 | 82 | 1 | 0.48 | 0.01 | 0.005 | 0.02 | 0.03 | 3.2 | 0.017 |
| RHIN0.1 | 20000829 | 1045 | 64 | 1 | 0.38 | 0.01 | 0.005 | 0.08 | 0.01 | 1.9 | 0.005 |
| LSNK5.0 | 20000829 | 1225 | 68 | 1 | 0.34 | 0.01 | 0.005 | 0.09 | 0.01 | 1.6 | 0.005 |
| LSNK0.1 | 20000829 | 1410 | 86 | 6 | 0.33 | 0.01 | 0.005 | 0.05 | 0.01 | 1.5 | 0.015 |
| WFLS0.1 | 20000829 | 1315 | 98 | 1 | 0.29 | 0.01 | 0.005 | 0.02 | 0.01 | 1.8 | 0.005 |
| FULL2.5 | 20000830 | 1220 | 194 | 4 | 0.82 | 0.01 | 0.005 | 0.57 | 0.04 | 2.1 | 0.035 |
| FULL1.5 | 20000830 | 1300 | 244 | 16 | 0.54 | 0.01 | 0.005 | 0.27 | 0.02 | 2.4 | 0.019 |
| SUSQ1A | 20000830 | 1100 | 162 | 8 | 2.54 | 1.46 | 0.090 | 0.23 | 0.18 | 4.2 | 0.120 |
| SUSQ1B | 20000830 | 1120 | 116 | 6 | 0.81 | 0.06 | 0.005 | 0.23 | 0.04 | 3.5 | 0.029 |
| SUSQ1C | 20000830 | 1140 | 132 | 8 | 0.80 | 0.01 | 0.005 | 0.24 | 0.03 | 6.7 | 0.031 |
| SUSQ2A | 20000830 | 0930 | 98 | 20 | 0.66 | 0.01 | 0.005 | 0.24 | 0.02 | 3.0 | 0.013 |
| SUSQ2B | 20000830 | 0950 | 110 | 12 | 0.71 | 0.01 | 0.005 | 0.24 | 0.02 | 3.3 | 0.014 |
| SUSQ2C | 20000830 | 1005 | 116 | 8 | 0.67 | 0.01 | 0.005 | 0.24 | 0.02 | 3.1 | 0.012 |
| CHEN1A | 20000830 | 0900 | 236 | 22 | 1.14 | 0.01 | 0.010 | 0.57 | 0.04 | 3.3 | 0.020 |
| CHEN1B | 20000830 | 0845 | 226 | 8 | 1.17 | 0.01 | 0.010 | 0.59 | 0.04 | 3.1 | 0.022 |
| CHEN1C | 20000830 | 0830 | 214 | 12 | 1.10 | 0.01 | 0.010 | 0.57 | 0.03 | 2.9 | 0.027 |

*Table A3. Upper Susquehanna Streams Habitat Scores Using Rapid Bioassessment Protocol for Use in Streams and Rivers, 2000*

| Station | Date (yymmdd) | Time (hhmm) | Predominant Material | Bottom Substrate | Embeddedness | Velocity/Depth Diversity | Pool/Riffle Ratio | Pool Quality |
|---|---|---|---|---|---|---|---|---|
| FABR 0.5 | 20000605 | 1330 | 3 | 16 | 18 | 10 | 11 | 3 |
| RHIN 0.1 | 20000605 | 1045 | 3 | 16 | 16 | 14 | 10 | 7 |
| RHIN 4.5 | 20000605 | 1200 | 3 | 17 | 17 | 15 | 14 | 11 |
| JONS 0.1 | 20000605 | 1530 | 3 | 16 | 17 | 10 | 10 | 7 |
| SILV 4.1 | 20000605 | 1430 | 3 | 16 | 16 | 10 | 11 | 7 |
| SILV 0.1 | 20000605 | 1215 | 3 | 12 | 16 | 8 | 10 | 4 |
| SNAK 0.5 | 20000606 | 0830 | 3 | 11 | 11 | 16 | 10 | 7 |
| SNAK 5.0 | 20000606 | 0930 | 3 | 16 | 16 | 16 | 12 | 11 |
| SNAK 8.5 | 20000605 | 1245 | 3 | 15 | 16 | 14 | 10 | 11 |
| SNAK 11.5 | 20000605 | 1125 | 3 | 15 | 16 | 15 | 12 | 11 |
| WLSC 0.1 | 20000606 | 1300 | 3 | 10 | 15 | 9 | 10 | 7 |
| LSNK 0.1 | 20000606 | 1500 | 3 | 14 | 14 | 10 | 9 | 10 |
| LSNK 5.0 | 20000606 | 1400 | 3 | 16 | 15 | 9 | 9 | 7 |
| FULL 0.5 | 20000607 | 1100 | 3 | 10 | 16 | 9 | 9 | 7 |
| FULL 1.5 | 20000607 | 1215 | 3 | 14 | 15 | 9 | 10 | 9 |
| FULL 2.5 | 20000607 | 1115 | 3 | 14 | 16 | 10 | 10 | 8 |
| FULL 3.5 | 20000607 | 1145 | 3 | 17 | 18 | 10 | 11 | 7 |

Predominant Material Rating: 1-Bedrook 2-Boulder 3-Cobble 4-Gravel 5-Sand/Silt/Clay
Bottom Substrate through Channel Alteration columns are rated on a scale of 1 to 20

*Table A3. Upper Susquehanna Streams Habitat Scores Using Rapid Bioassessment Protocol for Use in Streams and Rivers, 2000—Continued*

| Station | Date (yymmdd) | Time (hhmm) | Riffle/Run Quality | Channel Alteration | Upper/Lower Streambank Erosion | Upper/Lower Streambank Stability | Streamside Vegetative Cover | Forested Riparian Buffer Zone Width |
|---|---|---|---|---|---|---|---|---|
| FABR 0.5 | 20000605 | 1330 | 12 | 12 | 8 | 9 | 8 | 9 |
| RHIN 0.1 | 20000605 | 1045 | 11 | 10 | 6 | 7 | 6 | 3 |
| RHIN 4.5 | 20000605 | 1200 | 11 | 12 | 5 | 6 | 5 | 8 |
| JONS 0.1 | 20000605 | 1530 | 12 | 12 | 8 | 8 | 7 | 9 |
| SILV 4.1 | 20000605 | 1430 | 11 | 12 | 5 | 8 | 8 | 5 |
| SILV 0.1 | 20000605 | 1215 | 10 | 8 | 5 | 6 | 5 | 2 |
| SNAK 0.5 | 20000606 | 0830 | 9 | 8 | 5 | 8 | 5 | 2 |
| SNAK 5.0 | 20000606 | 0930 | 11 | 11 | 5 | 7 | 9 | 5 |
| SNAK 8.5 | 20000605 | 1245 | 10 | 10 | 6 | 6 | 7 | 2 |
| SNAK 11.5 | 20000605 | 1125 | 11 | 11 | 7 | 6 | 5 | 2 |
| WLSC 0.1 | 20000606 | 1300 | 11 | 10 | 5 | 6 | 5 | 2 |
| LSNK 0.1 | 20000606 | 1500 | 11 | 4 | 2 | 3 | 5 | 2 |
| LSNK 5.0 | 20000606 | 1400 | 11 | 9 | 5 | 6 | 6 | 2 |
| FULL 0.5 | 20000607 | 1100 | 9 | 11 | 6 | 9 | 3 | 2 |
| FULL 1.5 | 20000607 | 1215 | 9 | 5 | 4 | 5 | 6 | 2 |
| FULL 2.5 | 20000607 | 1115 | 11 | 7 | 5 | 7 | 7 | 2 |
| FULL 3.5 | 20000607 | 1145 | 8 | 11 | 8 | 8 | 8 | 8 |

Upper/Lower Stream bank Erosion through Forested Riparian Buffer Zone Width columns are rated on a scale of 1 to 10

*Table A4. Upper Susquehanna Visible Land Use Ranking, 2000*

| Station | Old Field | Deciduous Forest | Coniferous Forest | Wetland | Surface Mining | Landfill | Residential | Commercial/ Industrial | Cropland | Pasture | Orchard/ Vineyard/ Nursery | Other |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| FABR 0.5 | | 1 | 2 | | | | 3 | | | | | |
| RHIN 0.1 | | 2 | | | | | 1 | | | | | |
| RHIN 4.5 | | 1 | 3 | 2 | | | | | | | | |
| JONS 0.1 | | 1 | 2 | | | | 3 | | | | | |
| SILV 4.1 | | 1 | 2 | | | | | | | | | |
| SILV 0.1 | | | | | | | 1 | 2 | | | | |
| SNAK 0.5 | | 4 | | | | | 3 | | 2 | 1 | | |
| SNAK 5.0 | | 2 | | 3 | | | 4 | | 1 | | | |
| SNAK 8.5 | | | | | | | 1 | | | | | Playground (2), Cemetery (3) |
| SNAK 11.5 | 1 | 3 | | | | | 4 | | 2 | | | |
| WLSC 0.1 | | 2 | | | | | 1 | | | | | |
| LSNK 0.1 | | 4 | | | | | 3 | 1 | 2 | | | |
| LSNK 5.0 | | 2 | | | | | 1 | | | | | |
| FULL 0.5 | | | | | | | 2 | | | | | Playfield (1) |
| FULL 1.5 | | 2 | | | | | 1 | | | | | |
| FULL 2.5 | | 3 | | | | | 1 | | | | | Playground (2) |
| FULL 3.5 | | 1 | | | | | 3 | | | | | Playground (2) |
| FABR 0.5 | | | | | | | | | | | | |

Land Use ratings: 1 – very predominant use 2 – predominant use 3 – somewhat predominant use 4 – not a predominant use

*Table A5. Upper Susquehanna Stream Characteristics, 2000*

| Station | Meander | Braided | Channelized | Straight | Riffle | Run/ Glide | Deep Pool | Shallow Pool | Boulder >6ft | Boulder <6ft |
|---|---|---|---|---|---|---|---|---|---|---|
| FABR 0.5 | | | | P | P | P | | | | P |
| RHIN 0.1 | | | | P | P | P | | P | | P |
| RHIN 4.5 | P | | | | P | P | | P | | P |
| JONS 0.1 | P | | | | P | P | | P | | P |
| SILV 4.1 | P | | | | P | P | | P | | P |
| SILV 0.1 | | | | P | P | P | | | | |
| SNAK 0.5 | | | | P | P | P | | P | | |
| SNAK 5.0 | P | | | | P | P | P | P | | P |
| SNAK 8.5 | | | | P | P | P | P | P | | |
| SNAK 11.5 | P | | | | P | P | P | P | | |
| WLSC 0.1 | | | | P | P | P | | | | P |
| LSNK 0.1 | | | P | P | P | P | | P | | P |
| LSNK 5.0 | | | P | P | P | P | | P | | P |
| FULL 0.5 | | | | P | P | P | | P | | P |
| FULL 1.5 | | | P | P | P | P | | P | | P |
| FULL 2.5 | | | | P | P | P | | P | | P |
| FULL 3.5 | P | | | | P | P | | P | | P |

P = present

*Table A5. Upper Susquehanna Stream Characteristics, 2000—Continued*

| Station | Cobble | Bedrock | Gravel | Sand | Silt | Clay | Concrete/ Gabion | Root Wad | Undercut Bank |
|---|---|---|---|---|---|---|---|---|---|
| FABR 0.5 | P | P | | P | | | | | |
| RHIN 0.1 | P | | P | P | | | | P | |
| RHIN 4.5 | P | | P | P | | P | | P | P |
| JONS 0.1 | P | | P | P | | | | P | P |
| SILV 4.1 | P | | P | P | | | | | |
| SILV 0.1 | P | | P | P | | | | | |
| SNAK 0.5 | P | | P | P | | | | | |
| SNAK 5.0 | P | | P | P | | | | P | |
| SNAK 8.5 | P | | P | | | | | | |
| SNAK 11.5 | P | | P | | | | | | |
| WLSC 0.1 | P | | P | P | | | | | |
| LSNK 0.1 | P | | P | P | | | | P | |
| LSNK 5.0 | P | | P | P | | | | P | |
| FULL 0.5 | P | PP | P | P | | | P | | |
| FULL 1.5 | P | | P | P | | | | P | P |
| FULL 2.5 | P | PP | P | P | | | | | |
| FULL 3.5 | P | | P | P | | | | P | |

P = present
PP = highly present

*Table A5. Upper Susquehanna Stream Characteristics, 2000—Continued*

| Station | Overhead Cover | Human Refuse | Emergant Vegetation | Submergant Vegetation | Floating Vegetation | Storm Drain | Effluent Discharge | Beaver Pond | Woody Debris | Comments |
|---|---|---|---|---|---|---|---|---|---|---|
| FABR 0.5 | P | | | | | | | | P | |
| RHIN 0.1 | | P | | | | | | | P | |
| RHIN 4.5 | | | | P | | | | | P | |
| JONS 0.1 | P | | | | | | | | | |
| SILV 4.1 | P | | | P | | P | | | | Some algae on rocks |
| SILV 0.1 | | | | P | | | | | | Some rocks are algae covered, but not as bad as Snake 8.5 |
| SNAK 0.5 | | | | P | | | | | P | Algae covered bottom |
| SNAK 5.0 | P | | | P | | | | | P | |
| SNAK 8.5 | P | | | P | | | | | | Algae covered rocks, very slippery |
| SNAK 11.5 | P | | | | | P | | | P | |
| WLSC 0.1 | | P | | P | | | | | P | Algae covered rocks |
| LSNK 0.1 | | P | | P | | | | | P | Algae covered rocks |
| LSNK 5.0 | | | | P | | | | | P | Channelization—some dredging |
| FULL 0.5 | | P | | P | | | P | | | Algae covered bottom. Pipe outflow with high conductivity |
| FULL 1.5 | P | P | | P | | P | | | P | Algae covered bottom |
| FULL 2.5 | P | | | P | | | | | | Algae covered rocks |
| FULL 3.5 | P | | | | | | | | P | |

P = present

*Table A6. Upper Susquehanna Macroinvertebrate Data, 2000*

| Class: Order | Family | Genus | Pollution Tolerance Value | Trophic Level | FALLBK 0.5 6/5/00 | RHIN 0.1 6/5/00 | RHIN 4.5 6/5/00 | JONS 0.1 6/5/00 | SILV 4.1 6/5/00 | SILV 0.1 6/5/00 | SNAK 0.5 6/6/00 | SNAK 5.0 6/6/00 | SNAK 8.5 6/5/00 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Insecta: Coleoptera | Elmidae | *Elmidae* | 5 | | | | | | | | | | |
| | | *Optioservus* | 4 | SC | 1 | | | 6 | | 1 | | 2 | 2 |
| | | *Stenelmis* | 5 | SC | | 1 | 30 | 2 | | 4 | 2 | | 3 |
| | Psephenidae | *Psephenidae* | 4 | | | | | | | | | | |
| | | *Psephenus* | 4 | SC | 2 | 5 | 18 | | 5 | 2 | 1 | | 2 |
| Diptera | Chironomidae | *Chironomidae* | 7 | CG | 1 | 24 | 17 | 1 | 26 | 9 | 37 | 5 | 9 |
| | Simuliidae | *Simuliidae* | 6 | FC | | | 1 | | | | 2 | | 1 |
| | Tabanidae | *Tabanidae* | 6 | | | | | | | | | | |
| | | *Tabanus* | 5 | P | 1 | | 1 | | | 5 | | | |
| | Tipulidae | *Tipulidae* | 4 | | | | | | | | | | |
| | | *Antocha* | 3 | CG | | | | | | 1 | | 1 | |
| | | *Dicranota* | 3 | P | | | 1 | | | 1 | | | |
| | | *Hexatoma* | 2 | P | 5 | 3 | | | 7 | 2 | | 2 | 5 |
| | | *Tipula* | 4 | SH | | 1 | | | | | | | |
| Ephemeroptera | Ameletidae | *Ameletidae* | 0 | | | | | | | | | | |
| | | *Ameletus* | 0 | CG | | | | 1 | | | | | |
| | Baetidae | *Baetidae* | 6 | | | | | | | | | | |
| | | *Acentrella* | 4 | CG | 1 | | | | 1 | | 4 | | 2 |
| | | *Baetis* | 6 | CG | 1 | 19 | 12 | | 26 | 14 | 3 | 10 | 11 |
| | | *Centroptilum* | 2 | CG | 1 | | | 6 | 1 | | | | |
| | Ephemerellidae | *Ephemerellidae* | 2 | | | | | | | | | | |
| | | *Drunella* | 1 | SC | 8 | 2 | 1 | 3 | 7 | 6 | | 19 | 10 |
| | | *Ephemerella* | 1 | SC | 8 | | | | 2 | 16 | | 6 | 6 |
| | | *Serratella* | 2 | SC | | | | | 1 | | | 1 | |
| | Ephemeridae | *Ephemeridae* | 4 | | | | | | | | | | |
| | | *Ephemera* | 2 | CG | | | 5 | | 1 | | | | |

Pollution Tolerance Value rated from 0 to 10, with 0 being the least tolerant and 10 being the most tolerant

*Table A6. Upper Susquehanna Macroinvertebrate Data, 2000—Continued*

| Class: Order | Family | Genus | Pollution Tolerance Value | Trophic Level | FALLBK 0.5 6/5/00 | RHIN 0.1 6/5/00 | RHIN 4.5 6/5/00 | JONS 0.1 6/5/00 | SILV 4.1 6/5/00 | SILV 0.1 6/5/00 | SNAK 0.5 6/6/00 | SNAK 5.0 6/6/00 | SNAK 8.5 6/5/00 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ephemeroptera | Heptageniidae | *Heptageniidae* | 3 | | | | | | | | | | |
| | | *Epeorus* | 0 | CG | 8 | 1 | 1 | 51 | 8 | | | 4 | |
| | | *Heptagenia* | 4 | SC | 1 | 2 | 7 | | 2 | | 14 | 3 | 2 |
| | | *Stenacron* | 4 | SC | | | | | | | 1 | | |
| | Isonychiidae | *Isonychiidae* | 2 | | | | | | | | | | |
| | | *Isonychia* | 2 | FC | 3 | 1 | 3 | | 1 | 3 | 3 | 2 | |
| | Leptophlebiidae | *Leptophlebiidae* | 4 | | | | | | | | | | |
| | | *Leptophlebia* | 4 | CG | | | | | | | 11 | 2 | 11 |
| | | *Paraleptophlebia* | 1 | CG | | | | | | 3 | | | |
| Megaloptera | Corydalidae | *Corydalidae* | 3 | | | | | | | | | | |
| | | *Nigronia* | 2 | P | 1 | 2 | 2 | 1 | 4 | | 1 | 1 | 1 |
| | Sialidae | *Sialidae* | 4 | | | | | | | | | | |
| | | *Sialis* | 4 | P | | | 1 | | | | | | |
| Odonata | Aeshnidae | *Aeshnidae* | 3 | | | | | | | | | | |
| | | *Boyeria* | 2 | P | | | 1 | | 1 | | | | |
| | Gomphidae | *Gomphidae* | 4 | | | | | | | | | | |
| | | *Stylogomphus albistylus* | 4 | P | | | 2 | | | 1 | | 1 | |
| Plecoptera | Chloroperlidae | *Chloroperlidae* | 0 | | | | | | | | | | |
| | | *Alloperla* | 0 | CG | | 1 | | | | | | 1 | |
| | Leuctridae | *Leuctridae* | 0 | | | | | | | | | | |
| | | *Leuctra* | 0 | SH | 20 | 21 | 8 | 24 | 6 | 7 | 3 | 5 | 4 |
| | Nemouridae | *Nemouridae* | 2 | | | | | | | | | | |
| | | *Amphinemura* | 2 | SH | | | 1 | 3 | | | | | |
| | Perlidae | *Perlidae* | 2 | | | | | | | | | | |
| | | *Acroneuria* | 0 | P | 4 | 7 | 3 | 7 | 3 | 2 | | 4 | |
| | | *Paragnetina* | 1 | P | | | 2 | 2 | | 1 | | 2 | |

Trophic Level or Feeding Type: CG – Collector Gatherer SC – Scraper/Collector FC – Filterer/Collector P – Predator SH - Shredder

*Table A6. Upper Susquehanna Macroinvertebrate Data, 2000—Continued*

| Class: Order | Family | Genus | Pollution Tolerance Value | Trophic Level | FALLBK 0.5 6/5/00 | RHIN 0.1 6/5/00 | RHIN 4.5 6/5/00 | JONS 0.1 6/5/00 | SILV 4.1 6/5/00 | SILV 0.1 6/5/00 | SNAK 0.5 6/6/00 | SNAK 5.0 6/6/00 | SNAK 8.5 6/5/00 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Plecoptera | Perlodidae | *Perlodidae* | 2 | | | | | | | | | | |
| | | *Diploperla* | 2 | P | | | | | | | | | |
| | | *Isoperla* | 2 | P | | | | | | | | | |
| | Pteronarcyidae | *Pteronarcyidae* | 0 | | | | | | | | | | |
| | | *Pteronarcys* | 0 | SH | | | | | | 1 | | | |
| Trichoptera | Hydropsychidae | *Hydropsychidae* | 5 | | | | | | | | | | |
| | | *Cheumatopsyche* | 5 | FC | | | | | | 3 | | 2 | |
| | | *Diplectrona* | 0 | FC | 9 | | 10 | 2 | | | | | 2 |
| | | *Hydropsyche* | 4 | FC | | | | | 1 | 3 | | | 1 |
| | Philopotamidae | *Philopotamidae* | 3 | | | | | | | | | | |
| | | *Dolophilodes* | 0 | FC | 32 | | 9 | 7 | 10 | 24 | 3 | 26 | 18 |
| | Polycentropodidae | *Polycentropodidae* | 6 | | | | | | | | | | |
| | | *Neureclipsis* | 7 | FC | | | | | | 2 | | | |
| | | *Nyctiophylax* | 5 | FC | | 3 | | | | | | | |
| | | *Polycentropus* | 6 | FC | | | | | 1 | | 2 | 2 | 1 |
| | Rhyacophilidae | *Rhyacophilidae* | 1 | | | | | | | | | | |
| | | *Rhyacophila* | 1 | P | | | | | | | | | 1 |
| Oligochaeta: Haplotaxoda | Tubificidae | *Tubificidae* | 10 | CG | | | | | | | | | |
| Decopoda | Cambaridae | *Cambaridae* | 6 | P | 2 | | | 1 | | 1 | | | |
| Bivalvia: Pelecypoda | Corbiculidae | *Corbicula* | | | | | | | | | | 1 | |

*Table A6. Upper Susquehanna Macroinvertebrate Data, 2000—Continued*

| Biological Index Scores | FALLBK 0.5 | RHIN 0.1 | RHIN 4.5 | JONS 0.1 | SILV 4.1 | SILV 0.1 | SNAK 0.5 | SNAK 5.0 | SNAK 8.5 |
|---|---|---|---|---|---|---|---|---|---|
| | 6/5/00 | 6/5/00 | 6/5/00 | 6/5/00 | 6/5/00 | 6/5/00 | 6/6/00 | 6/6/00 | 6/5/00 |
| **RAW SUMMARY** | | | | | | | | | |
| Number of Individuals | 109 | 93 | 136 | 117 | 114 | 112 | 87 | 101 | 92 |
| % Shredders | 18.3486 | 23.6559 | 6.6176 | 23.0769 | 5.2632 | 7.1429 | 3.4483 | 4.95055 | 4.3478 |
| % Colleetor-Gatherers | 11.0092 | 48.3871 | 25.7353 | 50.4274 | 55.2632 | 24.10716 | 63.2184 | 22.7723 | 35.8696 |
| % Filterer-Colleetors | 40.3670 | 4.3011 | 16.9118 | 7.6923 | 11.4035 | 31.2500 | 11.4943 | 31.6832 | 25.0000 |
| % Serapers | 18.3486 | 10.7527 | 41.1765 | 9.4017 | 14.9123 | 25.8929 | 20.6897 | 30.6931 | 27.1739 |
| % Predators | 11.9266 | 12.9032 | 9.5588 | 9.4017 | 13.1579 | 11.6071 | 1.1494 | 9.9010 | 7.6087 |
| Number of EPT Taxa | 12 | 9 | 12 | 9 | 15 | 13 | 9 | 15 | 12 |
| Number of EPT Individuals | 96 | 57 | 62 | 105 | 71 | 85 | 44 | 89 | 69 |
| Number of Common Taxa | 19 | 11 | 13 | 11 | 15 | 13 | 9 | 22 | 13 |
| **METRIC SCORES** | | | | | | | | | |
| Taxonomie Richness | 19 | 15 | 22 | 15 | 20 | 23 | 14 | 21 | 19 |
| Diversity Index | 3.33 | 2.99 | 3.65 | 2.72 | 3.46 | 3.79 | 2.80 | 3.64 | 3.67 |
| Hilsenhoff Biotie Index | 0.7890 | 3.7419 | 3.6324 | 0.6154 | 3.6930 | 2.6518 | 5.0920 | 1.8911 | 2.880 |
| EPT Index | 12 | 9 | 12 | 9 | 15 | 13 | 9 | 15 | 12 |
| % Taxonomie Similarity | 100 | 36.63 | 33.47 | 43.36 | 44.84 | 53.39 | 15.31 | 58.77 | 50.75 |
| % Trophic Similarity | 100 | 56.34 | 62.45 | 55.85 | 54.52 | 79.36 | 45.45 | 75.89 | 66.31 |

*Table A6. Upper Susquehanna Macroinvertebrate Data, 2000—Continued*

| Class: Order | Family | Genus | Pollution Tolerance Value | Trophic Level | SNAK 11.5 6/5/00 | WLSC 0.1 6/6/00 | LSNK 0.1 6/6/00 | LSNK 5.0 6/6/00 | FULL 0.5 6/7/00 | FULL 1.5 6/7/00 | FULL 2.5 6/7/00 | FULL 3.5 6/7/00 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Insecta: Coleoptera | Elmidae | Elmidae | 5 | | | | | | | | | |
| | | *Optioservus* | 4 | SC | 13 | | | | | | | |
| | | *Stenelmis* | 5 | SC | | | | 1 | | 2 | 2 | |
| | Psephenidae | Psephenidae | 4 | | | | | | | | | |
| | | *Psephenus* | 4 | SC | 5 | | | | 3 | | 2 | |
| Diptera | Chironomidae | Chironomidae | 7 | CG | 12 | 7 | 4 | 24 | 33 | 49 | 19 | 10 |
| | Simuliidae | Simuliidae | 6 | FC | | | | 2 | 29 | 11 | | |
| | Tabanidae | Tabanidae | 6 | | | | | | | | | |
| | | *Tabanus* | 5 | P | | | | | | | | 2 |
| | Tipulidae | Tipulidae | 4 | | | | | | | | | |
| | | *Antocha* | 3 | CG | 1 | | | | | | | |
| | | *Dicranota* | 3 | P | | | | | | | | |
| | | *Hexatoma* | 2 | P | | 2 | | | 4 | 4 | 2 | |
| | | *Tipula* | 4 | SH | | | | 1 | | | | |
| Ephemeroptera | Ameletidae | Ameletidae | 0 | | | | | 1 | | | | |
| | | *Ameletus* | 0 | CG | | | | | | 1 | 4 | 7 |
| | Baetidae | Baetidae | 6 | | | | | | | | | |
| | | *Acentrella* | 4 | CG | | | | 3 | | | | |
| | | *Baetis* | 6 | CG | 12 | 10 | 11 | 9 | 5 | 2 | 1 | 2 |
| | | *Centroptilum* | 2 | CG | | | | 1 | | 6 | | |
| | Ephemerellidae | Ephemerellidae | 2 | | | | | | | | | |
| | | *Drunella* | 1 | SC | 7 | | 3 | 2 | | | | |
| | | *Ephemerella* | 1 | SC | 4 | | 1 | 7 | | | | |
| | | *Serratella* | 2 | SC | | | | | | | | |
| | Ephemeridae | Ephemeridae | 4 | | | | | | | | | |
| | | *Ephemera* | 2 | CG | | | | | | | | |

*Table A6. Upper Susquehanna Macroinvertebrate Data, 2000—Continued*

| Class: Order | Family | Genus | Pollution Tolerance Value | Trophic Level | SNAK 11.5 6/5/00 | WLSC 0.1 6/6/00 | LSNK 0.1 6/6/00 | LSNK 5.0 6/6/00 | FULL 0.5 6/7/00 | FULL 1.5 6/7/00 | FULL 2.5 6/7/00 | FULL 3.5 6/7/000 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ephemeroptera | Heptageniidae | Heptageniidae | 3 | | | | | | | | | |
| | | *Epeorus* | 0 | CG | | | | 2 | 5 | 29 | 51 | 24 |
| | | *Heptagenia* | 4 | SC | | 6 | 4 | 4 | | | | |
| | | *Stenacron* | 4 | SC | 1 | | | | | | | |
| | Isonychiidae | Isonychiidae | 2 | | | | | | | | | |
| | | *Isonychia* | 2 | FC | | | | | | | | |
| | Leptophlebiidae | Leptophlebiidae | 4 | | | | | | | | | |
| | | *Leptophlebia* | 4 | CG | | 30 | 7 | 12 | | | | 6 |
| | | *Paraleptophlebia* | 1 | CG | | | | | | | | |
| Megaloptera | Corydalidae | Corydalidae | 3 | | | | | | | | | |
| | | *Nigronia* | 2 | P | 4 | | | | 1 | | 1 | |
| | Sialidae | Sialidae | 4 | | | | | | | | | |
| | | *Sialis* | 4 | P | | | | | | | | |
| Odonata | Aeshnidae | Aeshnidae | 3 | | | | | | | | | |
| | | *Boyeria* | 2 | P | | | | | | | | |
| | Gomphidae | Gomphidae | 4 | | | | | | | | | |
| | | *Stylogomphus albistylus* | 4 | P | | | | 1 | | | | |
| Plecoptera | Chloroperlidae | Chloroperlidae | 0 | | | | | | | | | |
| | | *Alloperla* | 0 | CG | | 9 | 2 | | 1 | 1 | 2 | 6 |
| | Leuctridae | Leuctridae | 0 | | | | | | | | | |
| | | *Leuctra* | 0 | SH | 9 | 20 | | 3 | 29 | 14 | 25 | 50 |
| | Nemouridae | Nemouridae | 2 | | | | | | | | | |
| | | *Amphinemura* | 2 | SH | | | | 1 | | | 2 | 9 |
| | Perlidae | Perlidae | 2 | | | | | | | | | |
| | | *Acroneuria* | 0 | P | 2 | 2 | 1 | | 1 | 1 | 2 | |
| | | *Paragnetina* | 1 | P | | | | | | | | |

*Table A6. Upper Susquehanna Macroinvertebrate Data, 2000—Continued*

| Class: Order | Family | Genus | Pollution Tolerance Value | Trophic Level | SNAK 11.5 6/5/00 | WLSC 0.1 6/6/00 | LSNK 0.1 6/6/00 | LSNK 5.0 6/6/00 | FULL 0.5 6/7/00 | FULL 1.5 6/7/00 | FULL 2.5 6/7/00 | FULL 3.5 6/7/000 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Plecoptera | Perlodidae | Perlodidae | 2 | | | | | | | | | |
| | | *Diploperla* | 2 | P | 1 | | | 1 | | | | |
| | | *Isoperla* | 2 | P | | | | | | | | 8 |
| | Pteronarcyidae | Pteronarcyidae | 0 | | | | | | | | | |
| | | *Pteronarcys* | 0 | SH | | | | | | | | |
| Trichoptera | Hydropsychidae | Hydropsychidae | 5 | | | | | | | | | |
| | | *Cheumatopsyche* | 5 | FC | | | | | | | | |
| | | *Diplectrona* | 0 | FC | | | | | | | | |
| | | *Hydropsyche* | 4 | FC | 12 | | | 1 | | | | |
| | Philopotamidae | Philopotamidae | 3 | | | | | | | | | |
| | | *Dolophilodes* | 0 | FC | 52 | 1 | | 11 | | 2 | | 1 |
| | Polycentropodidae | Polycentropodidae | 6 | | | | | | | | | |
| | | *Neureclipsis* | 7 | FC | | | | | | | | |
| | | *Nyctiophylax* | 5 | FC | | | | | | | | |
| | | *Polycentropus* | 6 | FC | | | | | | | | |
| | Rhyacophilidae | Rhyacophilidae | 1 | | | | | | | | | |
| | | *Rhyacophila* | 1 | P | | | | | | | | |
| Oligochaeta: Haplotaxoda | Tubificidae | Tubificidae | 10 | CG | | | | | | 2 | | |
| Decopoda | Cambaridae | Cambaridae | 6 | P | | | | | | | | 3 |
| Bivalvia: Pelecypoda | Corbiculidae | *Corbicula* | | | | | | | | | | |

*Table A6. Upper Susquehanna Macroinvertebrate Data, 2000—Continued*

| Biological Index Scores | SNAK 11.5 | WLSC 0.1 | LSNK 0.1 | LSNK 5.0 | FULL 0.5 | FULL 1.5 | FULL 2.5 | FULL 3.5 |
|---|---|---|---|---|---|---|---|---|
| | 6/5/00 | 6/6/00 | 6/6/00 | 6/6/00 | 6/7/00 | 6/7/00 | 6/7/00 | 6/7/00 |
| **RAW SUMMARY** | | | | | | | | |
| Number of Individuals | 135 | 87 | 33 | 87 | 111 | 124 | 113 | 128 |
| % Shredders | 6.6667 | 22.9885 | 0 | 5.7471 | 26.1262 | 11.2903 | 23.8938 | 46.0938 |
| % Collector-Gatherers | 18.5185 | 64.3678 | 72.72733 | 58.6207 | 39.6396 | 72.5806 | 68.1416 | 42.9688 |
| % Filterer-Collectors | 47.4074 | 1.1494 | 0 | 16.0920 | 26.1261 | 10.4839 | 0 | 0.7813 |
| % Scrapers | 22.2222 | 6.8966 | 24.2424 | 16.0920 | 2.7027 | 1.6129 | 3.5398 | 0 |
| % Predators | 5.1852 | 4.5977 | 3.0303 | 2.2989 | 5.4054 | 4.03226 | 4.4248 | 10.1563 |
| Number of EPT Taxa | 9 | 7 | 7 | 13 | 5 | 7 | 6 | 8 |
| Number of EPT Individuals | 100 | 78 | 29 | 57 | 41 | 55 | 83 | 106 |
| Number of Common Taxa | 10 | 7 | 6 | 10 | 8 | 8 | 8 | 7 |
| **METRIC SCORES** | | | | | | | | |
| Taxonomic Richness | 14 | 9 | 8 | 19 | 10 | 13 | 12 | 12 |
| Diversity Index | 2.99 | 2.6 | 2.61 | 3.37 | 2.43 | 2.61 | 2.34 | 2.8 |
| Hilsenhoff Biotic Index | 2.2519 | 2.95409 | 4.30309 | 3.93109 | 4.1172 | 3.7984 | 1.4779 | 1.3125 |
| EPT Index | 9 | 7 | 7 | 13 | 5 | 7 | 6 | 8 |
| % Taxonomic Similarity | 49.18 | 28.57 | 11.27 | 30.77 | 31.82 | 27.47 | 33.33 | 28.69 |
| % Trophic Similarity | 81.56 | 42 | 32.39 | 51.54 | 63.59 | 38.43 | 37.32 | 40.3 |

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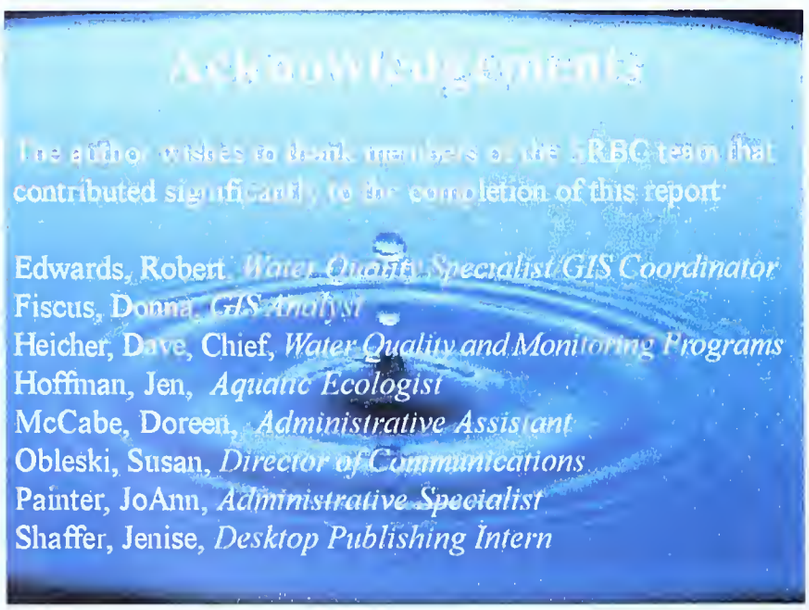
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McCabe, Doreen, Administrative Assistant
Obleski, Susan, Director of Communications
Painter, JoAnn, Administrative Specialist
Shaffer, Jenise, Desktop Publishing Intern

# Susquehanna River Basin Commission

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